
Rules of
Department of Natural Resources
Division 40–Land Reclamation Commission
Chapter 3–Permanent Performance Requirements
for Surface Coal Mining and Related Activities

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**Title 10—DEPARTMENT OF
NATURAL RESOURCES**

**Division 40—Land Reclamation
Commission**

**Chapter 3—Permanent Performance
Requirements for Surface Coal Mining
and Related Activities**

**10 CSR 40-3.010 Signs and Markers—
General Requirements**

PURPOSE: This rule sets forth general requirements as to signs and markers applicable to permanent performance requirements for surface coal mining in keeping with section 444.810, RSMo.

(1) Specifications. Signs and markers required under this chapter shall—

(A) Be posted and maintained by the person who conducts the surface mining activities;

(B) Be of a uniform design throughout the operation that can be easily seen and read;

(C) Be made of durable material; and

(D) Conform to local ordinances and codes.

(2) Duration of Maintenance. Signs and markers shall be maintained during the conduct of all activities to which they pertain.

(3) Mine and Permit Identification Signs.

(A) Identification signs shall be displayed at each point of access to the permit area from public roads.

(B) Signs shall show the name, business address and telephone number of the person who conducts the surface mining activities and the identification number of the current permit authorizing surface mining activities.

(C) Signs shall be retained and maintained until after the release of all bonds for the permit area.

(4) Perimeter Markers. The perimeter of a permit area shall be clearly marked before the beginning of surface mining activities.

(5) Bonded Area Markers. Where the permit area is bonded incrementally, the area bonded shall be clearly marked before the beginning of surface mining activities. Where the permit area is released in segments, the segments released shall be marked at the time of the release inspection unless already delineated by natural or man-made boundaries.

(6) Buffer Zone Markers. Buffer zones, as defined in 10 CSR 40-8.010(1)(A)13., shall be marked along their boundaries as required under 10 CSR 40-3.040(18).

(7) Topsoil Markers. Where topsoil or other vegetation-supporting material is segregated and stockpiled as required under 10 CSR 40-3.030(3), the stockpiled material shall be clearly marked.

AUTHORITY: section 444.530, RSMo 1999. Original rule filed Oct. 12, 1979, effective Feb. 11, 1980. Amended: Filed Jan. 5, 1987, effective July 1, 1987. Amended: Filed July 3, 1990, effective Nov. 30, 1990. Amended: Filed May 15, 1992, effective Jan. 15, 1993. Amended: Filed March 21, 2000, effective Oct. 30, 2000.*

**Original authority: 444.530, RSMo 1971, amended 1983, 1990, 1993.*

**10 CSR 40-3.020 Requirements for Casing
and Sealing of Drilled Holes**

PURPOSE: This rule sets forth the requirements for casing and sealing of drilled holes pursuant to sections 444.810 and 444.855.2(10)(iii), RSMo.

Editor's Note: The secretary of state has determined that the publication of this rule in its entirety would be unduly cumbersome or expensive. The entire text of the material referenced has been filed with the secretary of state. This material may be found at the Office of the Secretary of State or at the headquarters of the agency and is available to any interested person at a cost established by state law.

(1) General Requirements. Each exploration hole, other drill or borehole, well or other exposed underground opening shall be cased, sealed or otherwise managed, as approved in the permit and plan, to prevent acid or other toxic drainage from entering ground or surface waters, to minimize disturbance to the prevailing hydrologic balance and to ensure the safety of people, livestock, fish and wildlife, and machinery in the mine plan and adjacent area. If these openings are uncovered or exposed by surface mining activities within the permit area, they shall be permanently closed, unless approved for water monitoring or otherwise managed in a manner approved in the permit and plan. Use of a drilled hole or borehole or monitoring well as a water well must meet the provisions of 10 CSR 40-3.040(14) and those of the Wellhead Protection Section, Division of Geology and Land Survey, at 10 CSR 23, Chapter 6. This section does not apply to holes solely drilled and used for blasting.

(2) Temporary Casing and Sealing. Each exploration hole, other drill or boreholes, wells and other exposed underground openings which have been identified in the approved permit application to be used to monitor the groundwater conditions shall be temporarily sealed before use and protected during use by barricades, fences or other protective devices approved in the permit and plan. These devices shall be inspected periodically and maintained in good operating condition by the person who conducts the surface mining activities.

(3) Permanent Casing and Sealing. When no longer needed for monitoring or other use approved in the permit and plan, upon a finding of no adverse environmental or health or safety effect, or unless approved for transfer as a water well under 10 CSR 40-3.040(14) and those of the Wellhead Protection Section, Division of Geology and Land Survey, at 10 CSR 23, Chapter 6, each exploration hole, other drilled hole or borehole, well and other exposed underground opening shall be capped, sealed, backfilled or otherwise properly managed, as required in the permit and plan under section (1) of this rule and consistent with 30 CFR 75.1711. Permanent closure measures shall be designed to prevent access to the mine workings by people, livestock, fish and wildlife and machinery and to keep acid or other toxic drainage from entering ground or surface waters.

AUTHORITY: section 444.530, RSMo Supp. 1999. Original rule filed Oct. 12, 1979, effective Feb. 11, 1980. Amended: Filed March 21, 2000, effective Oct. 30, 2000.*

**Original authority: 444.530, RSMo 1971, amended 1983, 1990, 1993, 1995.*

**10 CSR 40-3.030 Requirements for Topsoil
Removal, Storage and Redistribution**

PURPOSE: This rule sets forth the requirements for topsoil removal, storage and redistribution pursuant to sections 444.810 and 444.855.2(5), RSMo.

(1) General Requirements.

(A) Topsoil and subsoils to be saved under section (2) of this rule shall be separately removed and segregated from other material.

(B) After removal, topsoil shall either be immediately redistributed as required under section (4) of this rule or stockpiled pending redistribution as required under section (3) of this rule.

(C) Topsoil and subsoils to be saved under section (2) of this rule shall be removed twenty-five feet (25') in advance of mining unless otherwise stated in the permit.

(2) Topsoil Removal.

(A) Timing. Topsoil shall be removed after vegetative cover that would interfere with the use of the topsoil is cleared from the areas to be disturbed, but before any drilling, blasting, mining or other surface disturbance identified and approved in the permit and plan.

(B) Materials to be Removed. All topsoil shall be removed in a separate layer from the areas to be disturbed, unless use of substitute or supplemental materials is approved in the permit and plan in accordance with subsection (2)(E) of this rule. If use of substitute or supplemental materials is approved, all materials to be redistributed shall be removed.

(C) Materials to be Removed in Thin Topsoil Situations. If the topsoil is less than six inches (6"), a six-inch (6") layer that includes the A horizon and the unconsolidated materials immediately below the A horizon or the A horizon and all unconsolidated material if the total available is less than six inches (6") shall be removed and the mixture segregated and redistributed as the surface soil layer, unless topsoil substitutes are approved in the permit and plan pursuant to subsection (2)(E) of this rule.

(D) Subsoil Segregation. The B horizon and portions of the C horizon, or other underlying layers demonstrated to have qualities for comparable root development shall be segregated and replaced as subsoil, if the permit and plan requires that either of these is necessary or desirable to ensure soil productivity consistent with the approved postmining land use.

(E) Topsoil Substitutes and Supplements.

1. Selected overburden materials may be substituted for or used as a supplement to topsoil, if in the permit and the plan it is determined that the resulting soil medium is equal to or more suitable for sustaining revegetation than is the available topsoil and the substitute material is the best available to support revegetation. This determination shall be based on—

A. The results of chemical and physical analyses of overburden and topsoil. These analyses shall include determinations of pH, net acidity or alkalinity, phosphorus, potassium, texture class and other analyses as required in the permit and plan. It may also be required in the permit and plan that results of field-site trials or greenhouse tests be used to demonstrate the feasibility of using these overburden materials; and

B. Results of analyses, trials and tests submitted to the director. Certification of trials and tests shall be made by a laboratory approved by the commission or director, stating that the—

(I) Proposed substitute material is equal to or more suitable for sustaining the vegetation than is the available topsoil;

(II) Substitute material is the best available material to support the vegetation; and

(III) Trials and tests were conducted using standard testing procedures.

2. Substituted or supplemental material shall be removed, segregated and replaced in compliance with the requirements for topsoil under this section.

(F) Limits on Topsoil Removal Area. These limits shall be addressed and approved as required to meet 10 CSR 40-3.040, 10 CSR 40-3.090, 10 CSR 40-6.040 and 10 CSR 40-6.050. Where the removal of vegetative material, topsoil or other materials may result in erosion which may cause air or water pollution—

1. The size of the area from which topsoil is removed at any one time shall be limited;

2. The surface soil layer shall be redistributed at a time when the physical and chemical properties of topsoil can be protected and erosion can be minimized; and

3. Other measures shall be taken as approved or required in the permit and plan to control erosion.

(3) Topsoil Storage.

(A) Topsoil and other materials removed under section (2) of this rule shall be stockpiled only when it is impractical to promptly redistribute this material on regraded areas.

(B) Stockpiled material shall be selectively placed on a stable area within the permit area, not disturbed and protected from wind and water erosion, unnecessary compaction and contaminants which lessen the capability of the materials to support vegetation when redistributed.

1. Protection measures shall be accomplished either by—

A. An effective cover of nonnoxious quickgrowing annual and perennial plants, seeded or planted during the first normal period after removal for favorable planting conditions; or

B. Other methods demonstrated in and approved in the permit and plan to provide equal protection.

2. Unless approved in the permit and plan, stockpiled topsoil and other materials shall not be moved until required for redistribution on a regraded area.

(4) Topsoil Redistribution.

(A) After final grading and before the replacement of topsoil and other materials segregated in accordance with section (3) of this rule, regraded land shall be scarified or otherwise treated as required in the permit and plan to eliminate slippage surfaces and to promote root penetration. If the person who conducts the surface mining activities shows through appropriate tests, and the commission or director approves, that no harm will be caused to the topsoil and vegetation, scarification may be conducted after topsoiling.

(B) Topsoil and other material shall be redistributed in a manner that—

1. Achieves an approximate uniform, stable thickness consistent with the approved postmining land uses, contours and surface water drainage system;

2. Prevents excess compaction and/or contamination of the topsoil; and

3. Protects the topsoil from wind and water erosion before and after it is seeded and planted.

(5) Topsoil Nutrients and Soil Amendments. Nutrients and soil amendments in the amounts determined by soil tests shall be applied to the redistributed surface soil layer, so that it supports the approved postmining land use and meets the revegetation requirements of 10 CSR 40-3.120. All soil tests shall be performed by a qualified laboratory using standard methods approved in the permit and plan.

AUTHORITY: section 444.530, RSMo 1994. Original rule filed Oct. 12, 1979, effective Feb. 11, 1980. Amended: Filed July 3, 1990, effective Nov. 30, 1990. Amended: Filed Sept. 15, 1994, effective April 30, 1995.*

**Original authority 1971, amended 1983, 1990, 1993.*

10 CSR 40-3.040 Requirements for Protection of the Hydrologic Balance

PURPOSE: This rule sets forth the requirements for protection of the hydrologic balance pursuant to sections 444.810 and 444.885.2(10), RSMo.

PUBLISHER'S NOTE: The publication of the full text of the material that the adopting agency has incorporated by reference in this rule would be unduly cumbersome or expensive. Therefore, the full text of that material will be made available to any interested person at both the Office of the Secretary of State and the office of the adopting agency, pursuant to section 536.031.4, RSMo. Such

material will be provided at the cost established by state law.

(1) General Requirements.

(A) Surface mining activities shall be planned and conducted to minimize changes to the prevailing hydrologic balance in both the mine plan and adjacent areas in order to prevent long-term adverse changes in that balance that could result from those activities.

(B) Mining and reclamation activities shall be conducted to prevent material damage to the hydrologic balance outside the permit area.

(C) Changes in water quality and quantity, in the depth to groundwater and in the location of surface water drainage channels shall be minimized so that the approved postmining land use of the permit area is not adversely affected.

(D) In no case shall federal and state water quality statutes, regulations, standards or effluent limitations be violated.

(E) Operations shall be conducted to minimize water pollution and, where necessary, treatment methods shall be used to control water pollution.

1. Each person who conducts surface mining activities shall emphasize mining and reclamation practices that prevent or minimize water pollution. Changes in flow of drainage shall be used in preference to the use of water treatment facilities.

2. Acceptable practices to control and minimize water pollution include, but are not limited to:

A. Stabilizing disturbed areas through land shaping;

B. Diverting runoff;

C. Achieving quickly germinating and growing stands of temporary vegetation;

D. Regulating channel velocity of water;

E. Lining drainage channels with rock or vegetation;

F. Mulching;

G. Selectively placing and sealing acid- and toxic-forming materials; and

H. Selectively placing waste materials in backfill areas.

3. If the practices listed in paragraph (1)(E)2. of this rule are not adequate to meet the requirements of this chapter, the person who conducts surface mining activities shall operate and maintain the necessary water treatment facilities for as long as treatment is required under this chapter.

(2) Water Quality Standards and Effluent Limitations.

(A) General Limitations.

1. All surface drainage from the disturbed area, including disturbed areas that have been graded, seeded or planted, shall be passed through a siltation structure or a series of siltation structures before leaving the permit area.

2. Siltation structures and other treatment facilities shall be maintained until the disturbed area has been restored and the vegetation requirements of 10 CSR 40-3.120 are met and the quality of the untreated drainage from the disturbed area meets the applicable state and federal water quality standards and requirements for the receiving stream.

3. Exemptions may be granted in the permit and plan from these requirements only when—

A. The disturbed drainage area within the total disturbed area is small; and

B. The person who conducts the surface mining activities demonstrates that siltation structures and treatment facilities are not necessary for drainage from the disturbed drainage areas to meet the effluent limitations of the applicable state and federal water quality standards for downstream receiving waters.

4. For the purpose of this section only, disturbed area shall not include those areas in which only diversion ditches, siltation structures or roads are installed in accordance with this chapter and the upstream area is not otherwise disturbed by the person who conducts the surface mining activities.

5. Siltation structures required by this section shall be constructed in accordance with section (6) of this rule, in appropriate locations before beginning any surface mining activities in the drainage area to be affected.

6. Where the siltation structure or series of siltation structures is used so as to result in the mixing of drainage from the disturbed areas with drainage from other areas not disturbed by current surface coal mining and reclamation operations, the permittee shall achieve the effluent limitations set forth in the following for all of the mixed drainage when it leaves the permit area.

(B) Discharges of water from areas disturbed by surface mining activities shall be made in compliance with all applicable state and federal water quality laws and regulations and with the effluent limitations for coal mining promulgated by the Missouri Clean Water Commission set forth in 10 CSR 20-7.015 and promulgated by the federal government set forth in the Federal Water Pollution Control Act, P.L. 92-500, 92nd Congress.

(C) Adequate facilities shall be installed, operated and maintained to treat any water discharged from the disturbed area so that it

complies with all federal and state laws, regulations and limitations of this section. If the pH of water to be discharged from the disturbed area is less than 6.0, an automatic lime feeder or other automatic neutralization process approved in the permit and plan shall be installed, operated and maintained. The permit and plan may authorize the use of a manual system, if it is found that—

1. Flow is infrequent and presents small and infrequent treatment requirements to meet applicable standards which do not require use of an automatic neutralization process; and

2. Timely and consistent treatment is ensured.

(3) Diversions and Conveyance of Overland Flow and Shallow Groundwater Flow and Ephemeral Streams. Overland flow, including flow through litter and shallow groundwater flow from undisturbed areas, and flow in ephemeral streams, may be diverted away from disturbed areas by means of temporary or permanent diversions, if required or approved in the permit and plan as necessary to minimize erosion, to reduce the volume of water to be treated and to prevent or remove water from contact with acid- or toxic-forming materials. The following requirements shall be met for all diversions and for all collection drains that are used to transport water into water treatment facilities and for all diversions of overland and shallow groundwater flow and ephemeral streams:

(A) Temporary diversions shall be constructed to pass safely the peak runoff from a precipitation event with a two (2)-year recurrence interval or a larger event as specified in the permit and plan;

(B) To protect fills and property and to avoid danger to public health and safety, permanent diversions shall be constructed to pass safely the peak runoff from a precipitation event with a ten (10)-year recurrence interval or a larger event as specified in the permit and plan. Permanent diversions shall be constructed with gently sloping banks that are stabilized by vegetation. Asphalt, concrete or other similar linings shall be used only when approved in the permit and plan to prevent seepage or to provide stability;

(C) Diversions shall be designed, constructed and maintained in a manner which prevents additional contributions of suspended solids to streamflow and to runoff outside the permit area, to the extent possible using the best technology currently available. Appropriate sediment control measures for these diversions may include, but not be limited to, maintenance of appropriate gradients,

channel lining revegetation, roughness structures and detention basins;

(D) No diversion shall be located so as to increase the potential for landslides. No diversion shall be constructed on existing landslides, unless approved in the permit and plan;

(E) When no longer needed, each temporary diversion shall be removed and the affected land regraded, topsoiled and revegetated in accordance with 10 CSR 40-3.030(4) and (5), 10 CSR 40-3.110 and 10 CSR 40-3.120;

(F) Diversion design shall incorporate the following:

1. Channel lining shall be designed using standard engineering practices to pass safely the design velocities. Riprap shall comply with the applicable requirements of 10 CSR 40-3.060(2)(B)3., except for sand and gravel;

2. Freeboard shall be no less than 0.3 feet. Protection shall be provided for transition of flows and for critical areas such as swales and curves. Where the area protected is a critical area as determined in the permit and plan, the design freeboard may be increased;

3. Energy dissipators shall be installed when necessary at discharge points, where diversions intersect with natural streams and exit velocity of the diversion ditch flow is greater than that of the receiving stream;

4. Excess excavated material not necessary for diversion channel geometry or regrading of the channel shall be disposed of in accordance with 10 CSR 40-3.060;

5. Topsoil shall be handled in compliance with 10 CSR 40-3.030; and

6. Diversions shall not be constructed or operated to divert water into underground mines; and

(G) All diversions shall be designed to minimize adverse impacts to the hydrologic balance within the permit and adjacent areas, to prevent material damage outside the permit area and to assure the safety of the public.

(4) Stream Channel Diversions.

(A) Flow from perennial and intermittent streams within the permit area may be diverted if the diversions—

1. Are approved in the permit and plan if the requirements in subsection (18)(A) of this rule are found;

2. Comply with other requirements of this chapter and 10 CSR 40-4; and

3. Comply with local, state and federal statutes and regulations.

(B) When streamflow is allowed to be diverted, the stream channel diversion shall

be designed, constructed and removed in accordance with the following:

1. The longitudinal profile of the stream, the channel and the floodplain shall be designed and constructed to remain stable and to prevent, to the extent possible using the best technology currently available, additional contributions of suspended solids to streamflow or to runoff outside the permit area. These contributions shall not be in excess of requirements of state or federal law. Erosion control structures such as channel lining structures shall be used in diversions only when approved in the permit and plan as being necessary to control erosion. These structures shall be approved for permanent diversions only where they are stable and will require infrequent maintenance;

2. The combination of channel, bank and floodplain configurations shall be adequate to safely pass the peak runoff of a ten (10)-year, twenty-four (24)-hour precipitation event for temporary diversions, a one hundred (100)-year, twenty-four (24)-hour precipitation event for permanent diversions or larger events required in the permit and plan. However, the capacity of the channel itself should be at least equal to the capacity of the unmodified stream channel immediately upstream and downstream of the diversion; and

3. The design and construction of all stream channel diversions of perennial and intermittent streams shall be certified by a qualified registered professional engineer as meeting the performance standards of this rule and any design criteria set by the director.

(C) When no longer needed to achieve the purpose for which they were authorized, all temporary stream channel diversions shall be removed and the affected land regraded and revegetated, in accordance with 10 CSR 40-3.030(4) and (5), 10 CSR 40-3.110 and 10 CSR 40-3.120. At the time diversions are removed, downstream water treatment facilities previously protected by the diversion shall be modified or removed to prevent overtopping or failure of the facilities. This requirement shall not relieve the person who conducts the surface mining activities from maintenance of a water treatment facility otherwise required under this chapter or the permit.

(D) When permanent diversions are constructed or stream channels restored, after temporary diversions, the operator shall—

1. Restore, enhance where practicable or maintain natural riparian vegetation on the banks of the stream;

2. Establish or restore the stream to its natural meandering shape of an environmen-

tally acceptable gradient, as determined in the permit and plan; and

3. Establish or restore the stream to a longitudinal profile and cross-section, including aquatic habitats (usually a pattern of riffles, pools and drops rather than uniform depth) that approximate premining stream channel characteristics.

(5) Sediment Control Measures.

(A) Appropriate sediment control measures shall be designed, constructed and maintained using the best technology currently available to—

1. Prevent, to the extent possible, additional contributions of sediment to streamflow or to runoff outside the permit area;

2. Meet the more stringent of applicable state or federal effluent limitations; and

3. Minimize erosion to the extent possible.

(B) Sediment control measures include practices carried out within and adjacent to the disturbed area. The sedimentation storage capacity of practices in and downstream from the disturbed area shall reflect the degree to which successful mining and reclamation techniques are applied to reduce erosion and control sediment. Sediment control measures consist of the utilization of proper mining and reclamation methods and sediment control practices, singly or in combination. Sediment control methods include:

1. Disturbing the smallest practicable area at any one time during the mining operation through progressive backfilling, grading and prompt revegetation as required in 10 CSR 40-3.120(1)(B);

2. Stabilizing the backfill material to promote a reduction in the rate and volume of runoff, in accordance with the requirements of 10 CSR 40-3.110(1);

3. Retaining sediment within disturbed areas;

4. Diverting runoff away from disturbed areas;

5. Diverting runoff using protected channels or pipes through disturbed areas so as not to cause additional erosion;

6. Using straw dikes, riprap, check dams, mulches, vegetative sediment filters, dugout ponds and other measures that reduce overland flow velocity, reduce runoff volume or trap sediment; and

7. Treating with chemicals.

(6) Siltations Structures.

(A) General Requirements. Siltation structures shall be used individually or in series and shall—

1. Be constructed before any disturbance of the undisturbed area to be drained into the pond;

2. Be located as near as possible to the disturbed area and out of perennial streams, unless approved in the permit and plan; and

3. Meet all the criteria of this section.

(B) Sediment Storage Volume. Siltation structures shall provide adequate sediment storage volume.

(C) Detention Time. Siltation structures shall provide the required theoretical detention time for the water inflow or runoff entering the pond from a ten (10)-year, twenty-four (24)-hour precipitation event (design event).

(D) Dewatering. The water storage resulting from inflow shall be removed by a non-clogging dewatering device that has been designed, constructed and maintained in accordance with subsection (6)(C) of this rule or a conduit spillway approved in the permit and plan. The dewatering device shall not be located at a lower elevation than the maximum elevation of the sedimentation storage volume.

(E) Each person who conducts surface mining activities shall design, construct and maintain siltation structures to prevent short-circuiting to the extent possible.

(F) The design, construction and maintenance of a siltation structure or other sediment control measures in accordance with this section shall not relieve the person from compliance with applicable effluent limitations as contained in section (2) of this rule.

(G) There shall be no outflow through the emergency spillway during the passage of the runoff resulting from the ten (10)-year, twenty-four (24)-hour precipitation event or lesser events through the siltation structure.

(H) Siltation structures shall be designed, constructed and maintained, to provide periodic sediment removal sufficient to maintain adequate volume for the design event.

(I) An appropriate combination of principal and emergency spillways shall be provided to safely discharge the runoff from a twenty-five (25)-year, twenty-four (24)-hour precipitation event or larger event required in the permit and plan. The elevation of the crest of the emergency spillway shall be a minimum of one foot (1') above the crest of the principal spillway. Emergency spillway grades and allowable velocities shall be approved in the permit and plan.

(J) The minimum elevation at the top of the settled embankment shall be one foot (1') above the water surface in the pond with the emergency spillway flowing at design depth. For embankments subject to settlement, this one foot (1') minimum elevation requirement

shall apply at all times, including the period after settlement.

(K) The constructed height of the dam shall be increased a minimum of five percent (5%) over the design height to allow for settlement, unless it has been demonstrated in the permit and plan that the material used and the design will ensure against all settlement.

(L) The minimum top width of the embankment shall not be less than the quotient of $(H+35)/5$, where H is the height, in feet, of the embankment as measured from the upstream toe of the embankment.

(M) The combined upstream and downstream side slopes of the settled embankment shall not be less than 1v:5h (20%), with neither slope steeper than 1v:2h (50%). Slopes shall be designed to be stable in all cases, even if flatter side slopes are required.

(N) The embankment foundation area shall be cleared of all organic matter, all surfaces sloped to no steeper than 1v:1h (100%) and the entire foundation surface scarified.

(O) The fill material shall be free of sod, large roots, other large vegetative matter and frozen soil, and in no case shall coal-processing waste be used.

(P) The placing and spreading of fill material shall be started at the lowest part of the foundation. The fill shall be brought up in horizontal layers of a thickness as is required to facilitate compaction and meet the design requirements of this section. Compaction shall be conducted as specified in the design approved in the permit and plan.

(Q) If a siltation structure has an embankment that is more than twenty feet (20') in height, as measured from the upstream toe of the embankment to the crest of the open channel emergency spillway, unless the emergency spillway is a pipe, where it is measured to the lowest point in the toe of the embankment, or has both an embankment that is five feet (5') or more in height, as measured from the upstream toe of the embankment to the crest of the open channel emergency spillway and a storage volume of twenty (20) acre-feet or more above the upstream toe of the embankment, the following additional requirements shall be met:

1. An appropriate combination of principal and emergency spillways shall be provided to discharge safely the runoff resulting from a one hundred (100)-year, twenty-four (24)-hour precipitation event or a larger event required in the permit and plan;

2. The embankment shall be designed and constructed with a static safety factor of at least one and five-tenths (1.5) or a higher safety factor as required in the permit and plan to ensure stability;

3. Appropriate barriers shall be provided to control seepage along conduits that extend through the embankment; and

4. The criteria of the Mine Safety and Health Administration (MSHA) as published in 30 CFR 77.216 shall be met.

(R) Each pond shall be designed and inspected during construction under the supervision of, and certified after construction by, a registered professional engineer.

(S) The entire embankment including the surrounding areas disturbed by construction shall be stabilized with respect to erosion by a vegetative cover or other means immediately after the embankment is completed. The active upstream face of the embankment where water will be impounded may be riprapped or otherwise stabilized. Areas in which the vegetation is not successful or where rills and gullies develop shall be repaired and revegetated in accordance with 10 CSR 40-3.110(6).

(T) Impoundments meeting the Class B or C criteria for dams in the U.S. Department of Agriculture, Soil Conservation Service (now renamed as the Natural Resources Conservation Service) Technical Release No. 60 (210-VI, TR-60, Revised Oct. 1985), entitled "Earth Dams and Reservoirs," hereafter in these rules referred to as TR-60, or the size or other criteria of 30 CFR 77.216 must be examined in accordance with 30 CFR 77.216-3. Impoundments which do not meet the above criteria shall be examined at least quarterly by a qualified person designated by the operator for the appearance of structural weakness and other hazardous conditions.

(U) Siltation structures shall not be removed until removal is authorized and until the disturbed area has been restored and the vegetation requirements of 10 CSR 40-3.120 are met and the drainage entering the pond has met the applicable state and federal water quality requirements for the receiving stream. In no case shall the structure be removed sooner than two (2) years after the last augmented seeding. When the siltation structure is removed, the affected land shall be regraded and revegetated in accordance with 10 CSR 40-3.110 and 10 CSR 40-3.120, unless the pond has been approved in the permit and plan for retention as being compatible with the approved postmining land use under 10 CSR 40-3.130. If approved in the permit and plan, the siltation structure shall meet all the requirements for permanent impoundments of sections (10) and (17).

(7) Other Treatment Facilities.

(A) Other treatment facilities shall be designed to treat the ten (10)-year, twenty-four (24)-hour precipitation event unless a

lesser design event is approved by the director based on terrain, climate, other site-specific conditions and a demonstration by the operator that the effluent limitations of 30 CFR 816.42 will be met.

(B) Other treatment facilities shall be designed in accordance with the applicable requirements of section (6) of this rule.

(8) Discharge Structures. Discharge from siltation structures, permanent and temporary impoundments, coal processing waste dams and embankments and diversions shall be controlled by energy dissipators, riprap channels and other devices, where necessary, to reduce erosion, to prevent deepening or enlargement of stream channels and to minimize disturbance of the hydrologic balance. Discharge structures shall be designed according to standard engineering design procedures.

(9) Acid- and Toxic-Forming Materials. Drainage from acid- and toxic-forming materials into ground and surface water shall be avoided by—

(A) Identifying and burying or treating, or both, when necessary, materials which may adversely affect water quality or be detrimental to vegetation or to public health and safety if not buried or treated, or both;

(B) Preventing water from coming into contact with acid- and toxic-forming materials in accordance with 10 CSR 40-3.110(3) and other measures as required in the permit and plan; and

(C) Burying or otherwise treating all acid- or toxic-forming materials within thirty (30) days after it is first exposed on the mine site, or within a lesser period required in the permit and plan. Temporary storage of the materials may be approved in the permit and plan upon a finding that burial or treatment within thirty (30) days is not feasible and will not result in any materials risk of water pollution or other environmental damage. Storage shall be limited to the period until burial or treatment, or both, first becomes feasible. Acid- or toxic-forming materials to be stored shall be placed on impermeable material and protected from erosion and contact with surface water.

(10) Permanent and Temporary Impoundment.

(A) Impoundments meeting the criteria of 30 CFR 77.216(a) shall comply with the requirements of 30 CFR 77.216 and this section. The plan required to be submitted to the district manager of the MSHA under 30 CFR 77.216 shall also be submitted to the director as part of the permit application. Further-

more, impoundments meeting the Class B or C criteria for dams in TR-60 shall comply with the “Minimum Emergency Spillway Hydrologic Criteria” table in TR-60 and the requirements of this section.

(B) Permanent impoundments are prohibited unless authorized in the permit and plan upon the basis of the following demonstration:

1. The quality of the impounded water shall be suitable on a permanent basis for its intended use and discharge of water from the impoundment shall not degrade the quality of receiving waters to less than the water quality standards established pursuant to applicable state and federal laws;

2. The level of water shall be sufficiently stable to support the intended use;

3. Adequate safety and access to the impounded water shall be provided for proposed water users;

4. Water impoundments shall not result in the diminution of the quality or quantity of water used by adjacent or surrounding landowners for agricultural, industrial, recreational or domestic uses;

5. The design, construction and maintenance of structures shall achieve the minimum design requirements applicable to structures constructed and maintained under the Watershed Protection and Flood Prevention Act, P. L. 83-566 (U.S.C. 1006). Requirements for impoundments that meet the size or other criteria of the MSHA, 30 CFR 77.216(a) are contained in United States Soil Conservation Service Technical Release No. 60, *Earth Dams and Reservoirs*, June 1976. Requirements for impoundments that do not meet the size or other criteria contained in 30 CFR 77.216(a) are contained in United States Natural Resources Conservation Service, Conservation Practice Standard, POND, No. CODE 378, December, 1998. The technical release and practice standard are incorporated by reference as they exist on the date of adoption of this chapter;

6. The size of the impoundment is adequate for its intended purposes; and

7. The impoundment will be suitable for the approved postmining land use.

(C) Temporary impoundments of water in which the water is impounded by a dam shall meet the requirements of subsections (6)(F)–(V) of this rule.

(D) Excavations that will impound water during or after the mining operation shall have perimeter slopes that are stable and shall not be steeper than 1v:2h (50%). Where surface runoff enters the impoundment area, the side slope shall be protected against erosion.

(E) Slope protection shall be provided to minimize surface erosion at the site and pro-

tect against sudden drawdown. Sediment control measures shall be required where necessary to reduce the sediment leaving the site.

(F) All embankments of temporary and permanent impoundments and the surrounding areas and diversion ditches disturbed or created by construction, shall be graded, fertilized, seeded and mulched to comply with the requirements of 10 CSR 40-3.120 immediately after the embankment is completed, provided that the active, upstream face of the embankment where water will be impounded may be rippedrap or otherwise stabilized. Areas in which the vegetation is not successful or where rills and gullies develop shall be repaired and revegetated to comply with the requirements of 10 CSR 40-3.110(6) and 10 CSR 40-3.120.

(G) All dams and embankments shall be routinely inspected by a qualified registered professional engineer or by someone under the supervision of a qualified registered professional engineer. The professional engineer or specialist shall be experienced in the design and construction of impoundments. Inspections shall be made regularly during construction, upon completion of construction and at least yearly until removal of the structure or release of the performance bond.

(H) All dams and embankments shall be routinely maintained during the mining operations. Vegetative growth shall be cut where necessary to facilitate inspection and repairs. Ditches and spillways shall be cleaned. Any combustible material present on the surface, other than material such as mulch or dry vegetation used for surface stability, shall be removed and all other appropriate maintenance procedures followed.

(I) All dams and embankments subject to 10 CSR 40 shall be certified by a qualified registered professional engineer during construction immediately after construction and annually after that as having been constructed, maintained, or both, to comply with the requirements of 10 CSR 40. All coal-processing waste dams and embankments covered by 10 CSR 40-3.080(9)–(11) shall be certified by a qualified registered professional engineer. Certification reports shall be provided certifying that the impoundment has been constructed and maintained as designed and in accordance with the approved plan and this chapter, shall include a discussion on any appearance of instability, structural weakness or other hazardous condition and shall include statements on:

1. Existing and required monitoring procedures and instrumentation;

2. The design depth and elevation of any impounded waters at the time of the initial certification report or the average and maxi-

imum depth and elevations of any impounded waters over the past year for the annual certification reports;

3. Existing storage capacity of the dam or embankment;

4. Any fires occurring in the construction material up to the date of the initial certification or over the past year for the annual certification reports; and

5. Any other aspects of the dam or embankment affecting stability, including structural weakness, erosion and other hazardous conditions.

(J) If any examination or inspection discloses that a potential hazard exists, the person who examined the impoundment shall promptly inform the director of the finding and of the emergency procedures formulated for public protection and remedial action. If adequate procedures cannot be formulated or implemented, the director shall be notified immediately. The director shall then notify the appropriate agencies that other emergency procedures are required to protect the public.

(K) Plans for any enlargement, reduction in size, reconstruction or other modification of dams or impoundments shall be submitted to the director and shall comply with the requirements of this section. Except where a modification is required to eliminate an emergency condition constituting a hazard to public health, safety or the environment, the plans will be approved before modification begins.

(L) Stability.

1. An impoundment meeting the Class B or C criteria for dams in TR-60, or the size or other criteria of 30 CFR 77.216(a) shall have a minimum static safety factor of 1.5 for a normal pool with steady state seepage saturation conditions, and a seismic safety factor of at least 1.2.

2. Impoundments not included in paragraph 40-3.040(10)(L)1. of this section, except for a coal mine waste impounding structure, shall have a minimum static safety factor of 1.3 for a normal pool with steady state seepage saturation conditions or meet the requirements of Natural Resources Conservation Service, Conservation Practice Standard, POND No. CODE 378, December, 1998, and be less than twenty feet (20') feet in height.

(M) Freeboard. Impoundments shall have adequate freeboard to resist overtopping by waves and by sudden increases in storage volume. Impoundments meeting the Class B or C criteria for dams in TR-60 shall comply with the freeboard hydrograph criteria in the "Minimum Emergency Spillway Hydrologic Criteria" table in TR-60.

(N) Foundation.

1. Foundations and abutments for an impounding structure shall be stable during all phases of construction and operation and shall be designed based on adequate and accurate information on the foundation conditions. For an impoundment meeting the Class B or C criteria for dams in TR-60, or the size or other criteria of 30 CFR 77.216(a), foundation investigation, as well as any necessary laboratory testing of foundation material, shall be performed to determine the design requirements for foundation stability.

2. All vegetative and organic materials shall be removed and foundations excavated and prepared to resist failure. Cutoff trenches shall be installed if necessary to ensure stability.

(O) Spillways. An impoundment shall have either a combination of principal and emergency spillways, a single spillway configured as specified in 10 CSR 40-3.040(10)(O)1. of this section, or no spillways as specified in 10 CSR 40-3.040(10)(O)3. of this section. The impoundment shall be designed and constructed to safely pass or contain the applicable design precipitation event specified in 10 CSR 40-3.040(10)(O)2. or 3. of this section.

1. A single open-channel spillway can be utilized if it is:

A. Of nonerodible construction and designed to carry sustained flows; or

B. Earth- or grass-lined and designed to carry short-term, infrequent flows at non-erosive velocities where sustained flows are not expected.

2. Except as specified in 10 CSR 40-3.040(10)(O)3. of this section, the required design precipitation event for an impoundment meeting the spillway requirements of 10 CSR 40-3.040(10)(O) of this section is:

A. For an impoundment meeting the Class B or C criteria for dams in TR-60, the emergency spillway hydrograph criteria in the "Minimum Emergency Spillway Hydrologic Criteria" table in TR-60;

B. For an impoundment meeting or exceeding the size or other criteria of 30 CFR 77.216(a), a one hundred (100)-year twenty-four (24)-hour event or greater as specified by the director or commission; or

C. For an impoundment not included in 10 CSR 40-3.040(10)(O)2. A. and B. of this section, as specified in Table 3 of the Natural Resources Conservation Service, Conservation Practice Standard, POND, No. CODE 378, December, 1998.

3. A temporary impoundment that relies solely on storage capacity to control the runoff from the design precipitation event may be utilized with no spillway when it is demonstrated by the operator and certified by a qualified registered professional engineer

that the impoundment will safely contain the design precipitation event, and that the stored water will be safely removed in accordance with current, prudent, engineering practices. Such an impoundment must be located where failure would not be expected to cause loss of life or serious property damage.

A. Impoundments meeting the Natural Resources Conservation Service Class B or C criteria for dams in TR-60, or the size or other criteria of 30 CFR 77.216(a) shall be designed to safely contain the runoff of the probable maximum precipitation (PMP) of a six (6)-hour event.

B. Impoundments not included in subparagraph 10 CSR 40-3.040(10)(O)3.A. of this section shall be designed to control the precipitation of the one hundred (100)-year twenty-four (24)-hour event.

C. For an impoundment not included in 10 CSR 40-3.040(10)(O)2.A. and B. of this section, as specified in Table 3 of the Natural Resources Conservation Service, Conservation Practice Standard, POND, No. CODE 378, December, 1998.

(11) Groundwater Protection.

(A) Backfilled materials shall be placed so as to minimize contamination of groundwater systems with acid, toxic or otherwise harmful mine drainage to minimize adverse effects of mining on groundwater systems outside the permit area, and to support approved postmining land uses.

(B) To control the effects of mine drainage, pits, cuts and other mine excavation or disturbances shall be located, designed, constructed and utilized in a manner as to prevent or control discharge of acid, toxic or otherwise harmful mine drainage waters into groundwater systems and to prevent adverse impacts on these groundwater systems or on approved postmining land uses.

(12) Protection of Groundwater Recharge Capacity. Surface mining activities shall be conducted in a manner that facilitates reclamation which will restore approximate premining recharge capacity through restoration of the capability of the reclaimed areas as a whole, excluding coal-processing waste and underground development waste disposal areas and fills, to transmit water to the groundwater system. The recharge capacity shall be restored to a condition which—

(A) Supports the approved postmining land use;

(B) Minimizes disturbances to the prevailing hydrologic balance in the mine plan area and in adjacent areas; and

(C) Provides a rate of recharge that approximates the premining recharge rate.

(13) Surface Water and Groundwater Monitoring.

(A) Groundwater.

1. Groundwater levels, infiltration rates, subsurface flow and storage characteristics and the quality of groundwater shall be monitored in a manner approved in the permit and plan, to determine the effects of surface mining activities on the recharge capacity of reclaimed lands and on the quantity and quality of water in groundwater systems in the mine plan and adjacent areas.

A. Groundwater monitoring data shall be submitted every three (3) months to the director or more frequently as prescribed by the director. Monitoring reports shall include analytical results from each sample taken during the reporting period. When the analysis of any groundwater sample indicates non-compliance with the permit conditions, the operator shall promptly notify the director and take remedial measures provided for in 10 CSR 40-6.050(9) and 10 CSR 40-6.070(14).

B. Groundwater monitoring shall proceed through mining and continue during reclamation until bond release. Consistent with the procedures of 10 CSR 40-6.090, the director may modify the monitoring requirements, including the parameters covered and the sampling frequency, if the operator demonstrates, using the monitoring data obtained under this paragraph, that—

(I) The operation has minimized disturbance to the prevailing hydrologic balance in the permit and adjacent areas and prevented material damage to the hydrologic balance outside the permit area; water quantity and quality are suitable to support approved postmining land uses and the water rights of other users have been protected or replaced; or

(II) Monitoring is no longer necessary to achieve the purposes set forth in the monitoring plan approved under 10 CSR 40-6.050(9)(C).

2. When surface mining activities may affect the groundwater systems serving as aquifers which significantly ensure the hydrologic balance of water use on or off the mine plan area, groundwater levels and groundwater quality shall be periodically monitored. Monitoring shall include measurements from a sufficient number of wells and mineralogical and chemical analyses of aquifer, overburden and spoil that are adequate to reflect changes in groundwater quantity and quality resulting from those activities. Monitoring shall be adequate to plan for modification of surface mining activities, if necessary, to minimize disturbance of the prevailing hydrologic balance.

3. As specified and approved in the permit and plan, the person who conducts surface mining activities shall conduct additional hydrologic tests, including drilling, infiltration tests and aquifer tests and shall submit the results to the director, to demonstrate compliance with sections (11)–(13) of this rule.

(B) Surface Water.

1. Surface water monitoring shall be conducted in accordance with the monitoring program submitted under 10 CSR 40-6.050(9)(C)4. and approved in the permit and plan. The permit and plan shall set forth the nature of data, frequency of collection and reporting requirements. Monitoring shall—

A. Be adequate to accurately measure and record water quantity and quality of the discharges from the permit area;

B. Be reported when analytical results of the sample collections indicate noncompliance with a permit condition or applicable standard; the person who conducts the surface mining activities shall notify the director within five (5) days. Where a National Pollutant Discharge Elimination System (NPDES) permit effluent limitation noncompliance has occurred, the person who conducts surface mining activities shall forward the analytic results concurrently with the written notice of noncompliance; and

C. Result in quarterly reports to the director, to include analytical results from each sample taken during the quarter. Any sample results which indicate a permit violation will be immediately reported to the director as provided for in 10 CSR 40-6.050(9) and 10 CSR 40-6.120(5). In those cases where the discharge for which water monitoring reports are required is also subject to regulation by an NPDES permit issued under the Clean Water Act of 1977 (30 U.S.C. Sections 1251–1378) and where the permit includes provisions for equivalent reporting requirements and requires filing of water monitoring reports within ninety (90) days or less of sample collection, the following alternative procedure shall be used. The person who conducts the surface mining activities shall submit to the director on the same time schedule as required by the NPDES permit or within ninety (90) days following sample collection, whichever is earlier, either:

(I) A copy of the completed reporting form filed to meet NPDES permit requirements; or

(II) A letter identifying the state or federal government official with whom the reporting form was filed to meet NPDES permit requirements and the date of filing.

2. After disturbed areas have been regraded and stabilized according to this chapter, the person who conducts surface mining activities shall monitor surface water flow and quality. Data from this monitoring may be used to demonstrate that the quality and quantity of runoff without treatment is consistent with the requirements of this chapter to minimize disturbance to the prevailing hydrologic balance and to attain the approved postmining land use. These data may also provide a basis for approval by the commission or director for removal of water quality or flow control systems.

3. Equipment, structures and other devices necessary to accurately measure and sample the quality and quantity of surface water discharges from the disturbed area shall be properly installed, maintained and operated and shall be removed when no longer required.

(14) Transfer of Wells.

(A) An exploratory or monitoring well may only be transferred by the person who conducts surface mining activities for further use as a water well with the prior approval of the commission or director. That person and the surface owner of the lands where the well is located shall jointly submit a written request to the director for that approval.

(B) Upon an approved transfer of a well, the transferee shall—

1. Assume primary liability for damages to persons or property from the well;

2. Plug the well when necessary, but in no case later than abandonment of the well; and

3. Assume primary responsibility for compliance with 10 CSR 40-3.020 and those of the Wellhead Protection Section, Division of Geology and Land Survey, at 10 CSR 23 Chapter 3 with respect to the well.

(C) Upon an approved transfer of a well, the transferor shall be secondarily liable for the transferee's obligations under subsection (13)(B) of this rule, until release of the bond or other equivalent guarantee required by 10 CSR 40-7 for the area in which the well is located.

(15) Water Rights and Replacement. Any person who conducts surface mining activities shall replace the water supply of an owner of interest in real property who obtains all or part of his/her supply of water for domestic, agricultural, industrial or other legitimate use from an underground or surface source, where the water supply has been affected by contamination, diminution or interruption proximately resulting from the surface mining activities.

(16) Discharge of Water into an Underground Mine. Surface water shall not be diverted or otherwise discharged into underground mine workings, unless allowed by section 577.155, RSMo and the person who conducts the surface mining activities demonstrates in the permit and plan application that this will—

(A) Abate water pollution or otherwise eliminate public hazards resulting from surface mining activities;

(B) Be discharged as a controlled flow, meeting the effluent limitations of section (2) of this rule for pH and total suspended solids;

(C) Not cause, result in or contribute to, in any event, a violation of applicable water quality standards or effluent limitations by discharging water from underground mines to surface waters;

(D) Minimize disturbance to the hydrologic balance; and

(E) Meet the approval of the MSHA.

(17) Postmining Rehabilitation of Siltation Structures, Diversions, Impoundments and Treatment Facilities. Before abandoning the permit area, the person who conducts the surface mining activities shall renovate all permanent siltation structures, diversions, impoundments and treatment facilities to meet criteria specified in the detailed design plan for the permanent structures and impoundments.

(18) Stream Buffer Zones.

(A) No land within one hundred feet (100') of a perennial stream or an intermittent stream shall be disturbed by surface mining activities, unless the director specifically authorizes surface mining activities closer to, or through, a perennial stream. The director may authorize these activities only upon finding that—

1. Surface mining activities will not cause or contribute suspended solids to stream flow or runoff outside the permit area in excess of the requirements established by the Missouri Clean Water Commission, Department of Natural Resources, set forth in 10 CSR 20-7.015 and promulgated by the federal government set forth in the Federal Water Pollution Control Act P.L. 92-500 and all modifications to these laws and regulations;

2. Surface mining activities will not adversely affect the water quantity and quality or other environmental resources of the stream; and

3. If there will be a temporary or permanent stream channel diversion, it will comply with section (4).

(B) The area not to be disturbed shall be designated as a buffer zone, and the operator

shall mark it as specified in 10 CSR 40-3.010.

AUTHORITY: sections 444.530 and 444.810, RSMo Supp. 1999. Original rule filed Oct. 12, 1979, effective Feb. 11, 1980. Amended: Filed April 14, 1980, effective Aug. 11, 1980. Amended: Filed Feb. 9, 1981, effective July 11, 1981. Amended: Filed April 2, 1986, effective July 26, 1986. Amended: Filed Sept. 15, 1988, effective Jan. 15, 1989. Amended: Filed July 3, 1990, effective Nov. 30, 1990. Amended: Filed May 15, 1992, effective Jan. 15, 1993. Amended: Filed Sept. 15, 1994, effective April 30, 1995. Amended: Filed March 21, 2000, effective Oct. 30, 2000.*

**Original authority: 444.530, RSMo 1971, amended 1983, 1990, 1993, 1995; and 444.810, RSMo 1979, amended 1983, 1993, 1995.*

10 CSR 40-3.050 Requirements for the Use of Explosives

PURPOSE: This rule sets forth the requirements for the use of explosives pursuant to 444.855, RSMo.

(1) General Requirements.

(A) Each operator shall comply with all applicable state and federal laws and regulations in the use of explosives.

(B) Blasts that use more than five (5 lbs.) pounds of explosive or blasting agent shall be conducted according to the schedule required by section (3) of this rule.

(C) Blasters.

1. Prior to the approval by the federal office of surface mining of a blaster certification program designated to regulate and document the quality of persons responsible for the removal of coal overburden by means of explosives in Missouri, all these operations shall be conducted by experienced, trained and competent persons who understand the hazards involved. By July 1, 1989 all blasting operations in Missouri shall be conducted under the direction of a certified blaster.

2. A blaster and at least one (1) other person shall be present at the firing of a blast.

3. Any person responsible for conducting blasting operations at a blasting site shall—

A. Be familiar with the blasting plan and site specific performance standards;

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

(D) Blast Design.

1. An anticipated blast design shall be submitted if blasting operations will be conducted within—

A. One thousand feet (1000') of any building used as a dwelling, public building, school, church, community, institutional building or dam outside the permit area including those listed in paragraph (5)(D)1.; or

B. Five hundred feet (500') of an active or abandoned underground mine.

2. The blast design may be presented either as part of a permit application or thirty (30) days before the initiation of blasting approved by the director or commission.

3. The blast design shall contain sketches of the drill patterns, delay periods and decking, and shall indicate the type and amount of explosives to be used, critical dimensions and the location and general description of structures to be protected, as well as a discussion of design factors to be used, which protect the public and meet the applicable airblast, flyrock and ground vibration standards in section (5) of this rule.

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

5. The director or commission may require changes to the design submitted.

(2) Use of Explosives: Preblasting Survey.

(A) At least forty (40) days before initiation of blasting, the operator shall ensure that all residents or owners of public buildings, schools, churches, community or institutional buildings, dwellings, dams or other structures, including those listed in paragraph (5)(D)1., located within one-half (1/2) mile of the permit area are notified by certified letter how to request a preblast survey.

(B) A resident or owner of a dwelling or structure within one-half (1/2) mile of any part of the permit area may request a preblasting survey. This request shall be made, in writing, directly to the operator or to the director or commission who shall promptly notify the operator. The operator shall ensure that a prompt preblast survey of the dwelling or structure will be conducted and that a written report of the survey is promptly prepared. The operator shall ensure that an updated survey of any additions, modifications or renovations shall be performed if requested by the resident or owner.

(C) The operator shall ensure that the condition of the dwelling or structure be determined and that any preblasting damage and other physical factors that could reasonably be affected by the blasting be documented. Structures such as pipelines, cables, transmission lines and cisterns, wells and other

water systems warrant special attention; however, the assessment of these structures may be limited to surface conditions and other readily available data.

(D) The written report of the survey shall be signed by the person who conducted the survey. Copies of the report shall be promptly provided to the director or commission and to the person requesting the survey. If the person requesting the survey disagrees with the contents, recommendations, or both, contained in the report, s/he may submit to both the operator and the director or commission a detailed description of the specific areas of disagreement within forty-five (45) days of receipt of the survey.

(E) The operator shall ensure that any surveys requested more than ten (10) days before the planned initiation of blasting shall be completed before the initiation of blasting.

(F) The operator shall ensure that the director or commission is provided a list of all people outlined in subsection (2)(A), including their addresses. The list shall distinguish between persons who have agreed to a preblast survey and those who have refused a survey.

(G) The operator shall ensure that the property owner be made aware that the preblast survey will be made at no cost to the property owner.

(3) Use of Explosives: Blasting Schedule.

(A) General Requirements.

1. The operator shall ensure that blasting operations are conducted at times approved by the director or commission and announced in the blasting schedule. The director or commission may limit the area covered, timing and sequence of blasting as listed in the schedule, if these limitations are necessary and reasonable in order to protect the public health and safety or welfare.

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

3. Unscheduled blasts may be conducted only where public or operator health and safety so require and for emergency blasting actions. When an operator conducts an unscheduled blast, the operator, using audible signals, shall notify residents within one-half (1/2) mile of the blasting site and document the reason for the unscheduled blast in accordance with section (6) of this rule.

(B) Blasting Schedule Publication and Distribution.

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

2. The operator shall distribute copies of the schedule to local governments and public utilities and to each local residence within one-half (1/2) mile of the proposed blasting site described in the schedule and to the director as soon as it has been published.

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

(C) Blasting Schedule Contents. The blasting schedule, at a minimum shall contain—

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

(4) Use of Explosives: Blasting Signs, Warnings and Access Control.

(A) Blasting Signs. Blasting signs shall meet the specifications of signs and markers outlined in 10 CSR 40-3.010(1). In addition, the operator shall—

1. Place conspicuous signs reading Blasting Area along the edge of any blasting area that comes within one hundred feet (100') of any public road right-of-way and at the point where any other road provides access to the blasting area; and

2. Place, at all entrances to the permit area from public roads or highways, conspicuous signs which state "Warning! Explosives in Use." clearly listing and describing the meaning of the audible blast warning and all-clear signals that are in use and which explaining the marking of blasting areas and loaded or charged holes awaiting firing within the permit area.

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

notified of the meaning of the signals in the blasting schedule.

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

1. No unusual hazards, such as imminent slides or undetonated charges exist; and
2. Access to and travel within the blasting area can be safely resumed.

(5) Use of Explosives: Control of Adverse Effects.

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

(B) Airblast.

1. Limits.

A. Airblast shall not exceed the maximum limits listed as follows at the location of any dwelling, public building, school, church or community or institutional building outside the permit area, except as provided in subsection (5)(E) of this rule:

Lower frequency limit of measuring system, Hz (=3dB)	Maximum level, in dB
0.1 Hz or lower-flat response*	134 peak
2 Hz or lower-flat response	133 peak
6 Hz or lower-flat response	129 peak
C-weighted, slow response*	105 peak dB

*Only when approved by the commission or director

B. If necessary to prevent damage, the director or commission shall specify lower maximum allowable airblast levels than those of subparagraph (5)(B)1.A. of this rule for use in the vicinity of a specific blasting operation.

2. Monitoring.

A. The operator shall ensure that one (1) blast every twelve (12) months is monitored at the nearest uncontrolled structure to ensure compliance with the airblast standards. The record, as per section (6) of this rule, of this monitored event shall be submitted to the director no later than January 31 of each year for the year being monitored. The director or commission may require airblast measurement of any or blasts and may specify the locations at which the measurements are taken.

B. The measuring systems shall have an upper end flat frequency response of at least two hundred hertz (200 Hz).

(C) Flyrock. Flyrock traveling in the air or along the ground shall not be cast from the blasting site—

1. Either more than one-half (1/2) the distance to the nearest dwelling or other occupied structure or beyond the permit boundary, whichever is the lesser; or

2. Beyond the area of control required under subsection (4)(C).

(D) Ground Vibration.

1. General. In all blasting operations, except as otherwise authorized in subsection (5)(E) of this rule, the maximum ground vibration shall not exceed the values approved in the blasting plan required under 10 CSR 40-6.050(4). The maximum ground vibration for protected structures listed in subparagraph (5)(D)2.A. of this rule shall be established in accordance with either the maximum peak particle velocity limits of paragraph (5)(D)2., the scaled distance equation of paragraph (5)(D)3., the blasting level chart of paragraph (5)(D)4. of this rule or by the commission or director under paragraph (5)(D)5. of this rule. All structures in the vicinity of the blasting area, not listed in subparagraph (5)(D)2.A. of this rule, such as water towers, pipelines, transmission lines and other utilities, tunnels, dams, impoundments and underground mines, shall be protected from damage by establishment of a maximum allowable limit on the ground vibration, submitted by the operator in the blasting plan and approved by the commission or director.

2. Maximum peak particle velocity.

A. The maximum ground vibration shall not exceed the following limits at the location of any dwelling, public building, school, church, community or institutional building outside the permit area:

Distance (D), from the blasting site, in feet	Maximum allowable peak particle velocity (Vmax) for ground vibration, in inches/second*	Scaled-distance factor to be applied without seismic monitoring** (Ds)
0—300	1.25	50
301—5000	1.00	55
5001 and beyond	0.75	65

*Ground vibration shall be measured as the particle velocity. Particle velocity shall be recorded in three (3) mutually perpendicular directions. The maximum allowable peak particle velocity shall apply to each of the three (3) measurements.

**Applicable to the scaled distance equation of subparagraph (5)(D)3.A. of this rule.

B. A seismographic record shall be provided for each blast.

3. Scaled distance equation.

A. An operator may use the scaled distance equation, $W = (D/D_s)^2$, to determine the allowable charge weight of explosives to be detonated in any eight (8) millisecond period, without seismic monitoring, where:

W=the maximum weight of explosives, in pounds;

D=the distance, in feet, from the blasting site to the nearest protected structure; and

D_s=the scaled distance factor, which may initially be approved by the commission using the values for scaled distance factor listed in subparagraph (5)(D)2.A. of this rule.

B. The development of a modified scaled distance factor may be authorized by the director or commission on receipt of a written request by the operator, supported by seismographic records of blasting at the mine site. The modified scale distance factor shall be determined such that the particle velocity of the predicted ground vibration will not exceed the prescribed maximum allowable peak particle velocity of subparagraph (5)(D)2.A. of this rule at a ninety-five percent (95%) confidence level.

4. Blasting level chart.

A. An operator may use the ground vibration limits in Figure 1 to determine the maximum allowable ground vibration.

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

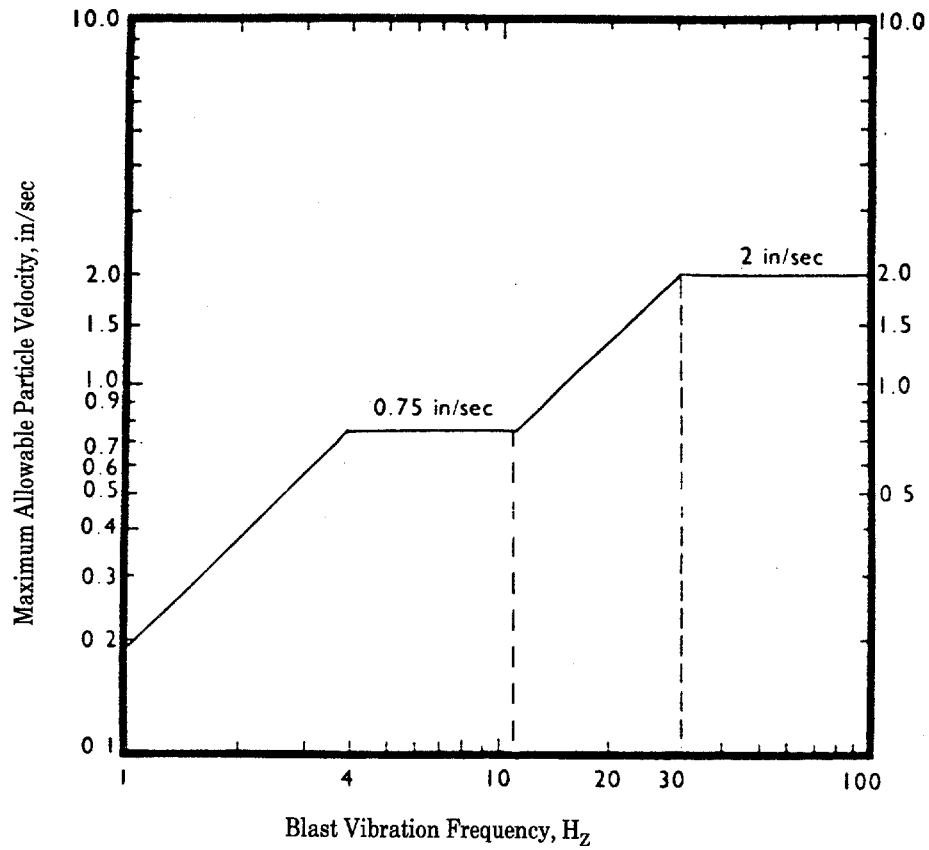


Figure 1. Alternative blasting level criteria.

(Source: Modified from figure B-1, Bureau of Mines R18507)

5. The maximum allowable ground vibration shall be reduced by the director or commission beyond the limits otherwise provided by this section, if determined necessary to provide damage protection.

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

(E) The maximum air blast and ground vibration standards of subsections (5)(B) and (D) of this rule shall not apply at the following locations:

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

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

(6) Use of Explosives: Records of Blasting Operations. The operator shall retain a record of all blasts for at least three (3) years. Upon request, copies of these records shall be made available to the director or commission and to the public for inspection. These records shall contain the following data:

(A) Name of the operator conducting the blast;

(B) Location, date and time of the blast;

(C) Name, certification number and signature of the blaster in charge conducting the blast;

(D) Identification, direction and distance, in feet, from the nearest blast hole to the nearest dwelling, public building, school, church, community or institutional building outside the permit area or those outlined in paragraph (5)(D)1., except those described in subsection (5)(E);

(E) Weather conditions, including those which may cause possible adverse blasting effects;

(F) Type of material blasted;

(G) Sketches of the blast pattern including number of holes, burden, spacing, decks and delay pattern;

(H) Diameter and depth of holes;

(I) Type of explosives used;

(J) Total weight of explosives used per hole;

(K) The maximum weight of explosives detonated in an eight (8)-millisecond period;

(L) Initiation system;

(M) Type and length of stemming;

(N) Mats or other protections used;

(O) Seismographic and airblast records, if required, which shall include:

1. Type of instrument, sensitivity and calibration signal or certification of annual calibration;

2. Exact location of instrument and the date, time and distance from the blast;

3. Name of the person and firm taking the reading;

4. Name of the person and firm analyzing the seismographic record; and

5. The vibration, air blast level, or both, recorded; and

(P) Reasons and conditions for each unscheduled blast.

AUTHORITY: sections 444.530 and 444.810, RSMo Supp. 1999. Original rule filed Oct. 12, 1979, effective Feb. 11, 1980. Amended: Filed April 14, 1980, effective Aug. 11, 1980. Amended: Filed July 15, 1980, effective Nov. 13, 1980. Amended: Filed Aug. 8, 1980, effective Dec. 11, 1980. Amended: Filed Dec. 10, 1980, effective April 11, 1981. Rescinded and readopted: Filed Jan. 5, 1987, effective July 1, 1987. Amended: Filed July 1, 1987, effective Sept. 25, 1987. Amended: Filed June 2, 1988, effective Aug. 25, 1988. Amended: Filed July 3, 1990, effective Nov. 30, 1990. Amended: Filed March 21, 2000, effective Oct. 30, 2000.*

**Original authority: 444.530, RSMo 1979, amended 1983, 1990, 1993, 1995; and 444.810, RSMo 1979, amended 1983, 1993, 1995.*

10 CSR 40-3.060 Requirements for the Disposal of Excess Spoil

PURPOSE: This rule sets forth the requirements for the disposal of excess spoil pursuant to sections 444.810 and 444.855.2(22), RSMo.

(1) General Requirements.

(A) Spoil not required to achieve the approximate original contour within the area where overburden has been removed shall be hauled or conveyed to and placed in designated disposal areas within a permit area, within a time approved by the director in the permit and plan, if the disposal areas are authorized for those purposes in the approved permit and plan in accordance with sections (1)—(4) of this rule. The spoil shall be placed in a controlled manner to ensure that—

1. Leachate and surface runoff from the fill will not degrade surface or ground waters or exceed the effluent limitations of 10 CSR 40-3.040(2);

2. The fill is stable; and

3. The land mass designated as the disposal area is suitable for reclamation and

revegetation compatible with the natural surroundings.

(B) The fill and appurtenant structures shall be designed using recognized professional standards, certified by a registered professional engineer experienced in the design of earth and rock fills and approved in the permit and plan.

(C) All vegetative and organic materials shall be removed from the disposal area and the topsoil shall be removed, segregated and stored or replaced under 10 CSR 40-3.030(1)—(5). If approved in the permit and plan, organic material may be used as mulch or may be included in the topsoil to control erosion, promote growth of vegetation or increase the moisture retention of the soil.

(D) Slope protection shall be provided to minimize surface erosion at the site. Diversion design shall conform with the requirements of 10 CSR 40-3.040(3). All disturbed areas, including diversion ditches that are not ripped, shall be vegetated upon completion of construction.

(E) If placed on a slope, the spoil is placed upon the most moderate slope among those upon which, in the judgment of the commission, the spoil could be placed in compliance with all the requirements of this law and shall be placed, where possible, upon or above, a natural terrace, bench or berm, if this placement provides additional stability and prevents mass movement.

(F) The spoil shall be hauled or conveyed and placed in horizontal lifts in a controlled manner, not exceeding four feet (4') in thickness; concurrently compacted as necessary to ensure mass stability and prevent mass movement, covered and graded to allow surface and subsurface drainage to be compatible with the natural surroundings and ensure a long-term static safety factor of one and five tenths (1.5). The commission or director may approve a design which incorporates placement of excess spoil in horizontal lifts other than four feet (4') in thickness when it is demonstrated by the operator and certified by a qualified registered professional engineer that the design will ensure the stability of the fill and will meet all other applicable requirements.

(G) The final configuration of the fill must be suitable for postmining land uses approved in accordance with 10 CSR 40-3.130(1), except that no depressions or impoundments shall be allowed on the completed fill.

(H) Excess spoil that is acid- or toxic-forming or combustible shall be adequately covered with nonacid, nontoxic and noncombustible material, or treated to control the

impact on surface and ground water in accordance with 10 CSR 40-3.040, to prevent sustained combustion and to minimize adverse effects on plant growth and the approved postmining land use.

(I) Terraces may be utilized to control erosion and enhance stability if approved in the permit and plan and consistent with 10 CSR 40-3.110(2)(B).

(J) Where the slope in the disposal area exceeds 1v:2.8h (36%), or a lesser slope as may be designated in the permit or plan based on local conditions, keyway cuts (excavations to stable bedrock) or rock toe buttresses shall be constructed to stabilize the fill. Where the toe of the spoil rests on a downslope, stability analyses including, but not limited to, strength parameters, pore pressures and long-term seepage conditions, shall be performed to determine the size of rock toe buttresses and keyway cuts and in accordance with 10 CSR 40-6.050(17).

(K) Fill Inspection.

1. A registered professional engineer or other qualified professional specialist, approved in the permit and plan and experienced in the construction of earth and rockfill embankments, shall inspect the fill for stability at least quarterly throughout construction and during the following critical construction periods:

- A. Removal of all organic material and topsoil;
- B. Placement of underdrainage systems;
- C. Installation of surface drainage systems;
- D. Placement and compaction of fill materials; and
- E. Revegetation.

2. Within two (2) weeks after each inspection, the registered professional engineer or other qualified professional specialist shall provide the director with a certified report stating that the fill has been constructed as specified in the design approved in the permit and plan. The report shall include appearances of instability, structural weakness and other hazardous conditions.

3. Certified report.

A. The certified report on the drainage system and protective filters shall include color photographs taken during and after construction, but before underdrains are covered with excess spoil. If the underdrain system is constructed in phases, each phase shall be certified separately.

B. Where excess durable rock spoil is placed in single or multiple lifts so that the underdrain system is constructed simultaneously with excess spoil placement by the natural segregation of dumped materials, color

photographs shall be taken of the underdrain as the underdrain system is being formed.

C. The photographs accompanying each certified report shall be taken in adequate size and number with enough terrain or other physical features of the site shown to provide a relative scale to the photographs and to specifically and clearly identify the site.

4. A copy of the report shall be retained at the minesite.

(L) Coal processing wastes shall not be disposed of in head-of-hollow or valley fills and may only be disposed of in other excess spoil fills, if the waste is—

- 1. Placed in accordance with 10 CSR 40-3.080(4);
- 2. Demonstrated to be nontoxic- and nonacid-forming; and
- 3. Demonstrated to be consistent with the design stability of the fill.

(M) If the disposal area contains springs, natural or man-made watercourses or wet weather seeps, an underdrain system consisting of durable rock shall be constructed from the wet areas in a manner that prevents infiltration of the water into the spoil material. The underdrain system shall be protected by an adequate filter and shall be designed and constructed using standard geotechnical engineering methods.

(N) The foundation and abutments of the fill shall be stable under all conditions of construction and operation. Sufficient foundation investigation and laboratory testing of foundation materials shall be performed in order to determine the design requirements for stability of the foundation. Analyses of foundation conditions shall include the effect of underground mine workings, if any, upon the stability of the structure.

(O) Excess spoil may be returned to underground mine workings, but only in accordance with a disposal program approved in the permit and plan and Mine Safety and Health Administration (MSHA) upon the basis of a plan submitted under 10 CSR 40-6.120(17).

(2) Valley Fills. Valley fills shall meet all of the requirements of section (1) of this rule and the additional requirements of this section.

(A) The fill shall be designed to attain a long-term static safety factor of one and five-tenths (1.5) based upon data obtained from subsurface exploration, geotechnical testing, foundation design and accepted engineering analyses.

(B) A subdrainage system for the fill shall be constructed in accordance with the following:

1. A system of underdrains constructed of durable rock shall meet the requirements of paragraph (2)(B)4. of this rule and shall—

- A. Be installed along the natural drainage system;
- B. Extend from the toe to the head of the fill; and
- C. Contain lateral drains to each area of potential drainage or seepage;

2. A filter system to insure the proper functioning of the rock underdrain system shall be designed and constructed using standard geotechnical engineering methods;

3. In constructing the underdrains, no more than ten percent (10%) of the rock may be less than twelve inches (12”) in size and no single rock may be larger than twenty-five percent (25%) of the width of the drain. Rock used in underdrains shall meet the requirements of paragraph (2)(B)4. of this rule. The minimum size of the main underdrain shall be—

Total Amount of Fill Material	Predominant Type of Fill Material	Minimum Size of Drain in Feet	
		Width	Height
Less than 1,000,000 yd ³ Do	Sandstone	10	4
	Shale	16	8
More than 1,000,000 yd ³ Do	Sandstone	16	8
	Shale	16	16

4. Underdrains shall consist of non-degradable, nonacid- and nontoxic-forming rock, such as natural sand and gravel, sandstone, limestone or other durable rock that will not slake in water and will be free of coal, clay or shale.

(C) Spoil shall be hauled or conveyed and placed in a controlled manner and concurrently compacted, as specified in the permit and plan, in lifts no greater than four feet (4’) or less, if required in the permit and plan, to—

- 1. Achieve the densities designed to ensure mass stability;
- 2. Prevent mass movement;
- 3. Avoid contamination of the rock underdrain or rock core; and
- 4. Prevent formation of voids.

(D) Surface water runoff from the area above the fill shall be diverted away from the fill and into stabilized diversion channels designed to safely pass the runoff from a one hundred (100)-year, twenty-four (24)-hour precipitation or longer event specified in the permit and plan. Surface runoff from the fill surface shall be diverted through stabilized channels off the fill which will safely pass the runoff from the one hundred (100)-year, twenty-four (24)-hour precipitation event. Diversion design shall comply with the requirements of 10 CSR 40-3.040(3)(F).



(E) The tops of the fill and any terrace constructed to stabilize the face shall be graded no steeper than 1v:20h (5%). The vertical distance between terraces shall not exceed fifty feet (50').

(F) Drainage shall not be directed over the outslope of the fill.

(G) The outslope of the fill shall not exceed 1v:2h (50%). The permit and plan may require a flatter slope to control erosion and insure stability.

(3) Head-of-Hollow Fills. Disposal of spoil in the head-of-hollow fill shall meet all standards set forth in sections (1) and (2) of this rule and the additional requirements of this section.

(A) The fill shall be designed to completely fill the disposal site to the approximate elevation of the ridgeline. A rock-core chimney drain may be utilized instead of the subdrain and surface diversion system required for valley fills. If the crest of the fill is not approximately at the same elevation as the low point of the adjacent ridgeline, the fill must be designed as specified in section (2) of this rule, with diversion of runoff around the fill. A fill associated with contour mining placed at or near the coal seam, which does not exceed two hundred fifty thousand (250,000) cubic yards, may use the rock-core chimney drain.

(B) The alternative rock-core chimney drain system shall be designed and incorporated into the construction of head-of-hollow fills as follows:

1. The fill shall have, along the vertical projection of the main buried stream channel or rill, a vertical core of durable rock at least sixteen feet (16') thick which shall extend from the toe of the fill to the head of the fill, and from the base of the fill to the surface of the fill. A system of lateral rock underdrains shall connect this rock core to each area of potential drainage or seepage in the disposal area. Rocks used in the rock core and underdrains shall meet the requirements of subsection (2)(B) of this rule;

2. A filter system to ensure the proper functioning of the rock core shall be designed and constructed using standard geotechnical engineering methods; and

3. The grading may drain surface water away from the outslope of the fill and toward the rock core. The maximum slope of the fill shall be 1v:33h (3%). Instead of the requirements of subsection (1)(G) of this rule, a drainage pocket may be maintained at the head of the fill during and after construction, to intercept surface runoff and discharge the runoff through or over the rock drain, if stability of the fill is not impaired. In no case

shall this pocket or sump have a potential for impounding more than ten thousand (10,000) cubic feet of water. Terraces on the fill shall be graded with the three percent to five percent (3%—5%) grade toward the fill and a one percent (1%) slope toward the rock core.

(C) The drainage control system shall be capable of safely passing the runoff from a one hundred (100)-year, twenty-four (24)-hour precipitation event or larger event specified in the permit and plan.

(4) Durable Rock Fills. In lieu of the requirements of sections (2) and (3) of this rule, approval may be given in the permit and plan for alternate methods for disposal of hard rock spoil, including fill placement by dumping in a single lift, on a site-specific basis, provided the services of a registered professional engineer experienced in the design and construction of earth and rockfill embankments are utilized and provided the requirements of this section and of section (1) of this rule are met. For this section, hard rock spoil shall be defined as rockfill consisting of at least eighty percent (80%) by volume of sandstone, limestone or other rocks that do not slake in water. Resistance of the hard rock spoil to slaking shall be determined by using the slake index and slake durability tests in accordance with guidelines and criteria established in the permit and plan.

(A) Spoil is to be transported and placed in a specified and controlled manner which will ensure stability of the fill.

1. The method of spoil placement shall be designed to ensure mass stability and prevent mass movement in accordance with the additional requirements of this section.

2. Loads of noncemented clay shale, clay spoil, or both, in the fill shall be mixed with hard rock spoil in a controlled manner to limit, on a unit basis, concentrations of noncemented clay shale and clay in the fill. The materials shall comprise no more than twenty percent (20%) of the fill volume as determined by tests performed by a registered professional engineer and approved in the permit and plan.

(B) Stability Analyses and Bank Design.

1. Stability analyses shall be made by the registered professional engineer. Parameters used in the stability analyses shall be based on adequate field reconnaissance, subsurface investigations, including borings and laboratory tests.

2. The embankment which constitutes the valley fill or head-of-hollow fill shall be designed with the following factors of safety:

Case	Design Condition	Minimum Factor of Safety
I	End of construction	1.5
II	Earthquake	1.1

(C) The design of a head-of-hollow fill shall include an internal drainage system which will ensure continued free drainage of anticipated seepage from precipitation, springs or wet weather seeps.

1. Anticipated discharge from springs and seeps and due to precipitation shall be based on records, field investigations, or both, to determine seasonal variation. The design of the internal drainage system shall be based on the maximum anticipated discharge.

2. All granular material used for the drainage system shall be free of clay and consist of durable particles, such as natural sands and gravels, sandstone, limestone or other durable rock, which will not slake in water.

3. The internal drain shall be protected by a properly designed and constructed filter system using standard geotechnical engineering methods.

(D) Surface water runoff from the areas adjacent to and above the fill shall not be allowed to flow onto the fill and shall be diverted into stabilized channels which are designed to safely pass the runoff from a one hundred (100)-year, twenty-four (24)-hour precipitation event. Diversion design shall comply with the requirements of 10 CSR 40-3.040(3)(F).

(E) The top surface of the completed fill shall be graded so that the final slope after settlement will be no steeper than 1v:20h (5%) toward properly designed drainage channels in natural ground along the periphery of the fill. Surface runoff from the top surface of the fill shall not be allowed to flow over the outslope of the fill.

(F) Surface runoff from the outslope of the fill shall be diverted off the fill to properly designed channels which will safely pass a one hundred (100)-year, twenty-four (24)-hour precipitation event. Diversion design shall comply with the requirements of 10 CSR 40-3.040(3)(F).

(G) Terraces shall be constructed on the outslope if required for control of erosion or for roads included in the approved postmining land use plan. Terraces shall meet the following requirements:

1. The slope of the outslope between terrace benches shall not exceed 1v:2h (50%);

2. To control surface runoff, each terrace bench shall be graded to a slope of 1v:20h (5%) toward the embankment. Runoff shall be collected by a ditch along the intersection of each terrace bench and the outslope; and

3. Terrace ditches shall have a five percent (5%) slope toward the channels specified in subsection (4)(F) of this rule, unless steeper slopes are necessary in conjunction with approved roads.

AUTHORITY: sections 444.530 and 444.810, RSMo 1994. Original rule filed Oct. 12, 1979, effective Feb. 11, 1980. Amended: Filed Aug. 8, 1980, effective Dec. 11, 1980. Amended: Filed Dec. 10, 1980, effective April 11, 1981. Amended: Filed Sept. 15, 1988, effective Jan. 15, 1989. Amended: Filed July 3, 1990, effective Nov. 30, 1990. Amended: Filed Sept. 15, 1994, effective April 30, 1995.*

**Original authority: 444.530, RSMo 1979, amended 1983, 1990, 1993 and 444.810, RSMo 1979, amended 1983, 1993.*

10 CSR 40-3.070 Requirements for the Protection of Underground Mining

PURPOSE: This rule sets forth the requirements for the protection of underground mining from surface coal mining activities pursuant to sections 444.810, 444.855.2(12) and 444.860, RSMo.

(1) Protection of Underground Mining. No surface coal mining activities shall be conducted closer than five hundred feet (500') to any point of either an active or abandoned underground mine, except to the extent that—

(A) The nature, timing and sequence of the operations are jointly approved in the permit and plan and by the United States Mine Safety and Health Administration and the Missouri Department of Labor and Industrial Relations; and

(B) The activities result in improved resource recovery, abatement of water pollution or elimination of hazards to the health and safety of the public.

(2) Surface mining activities shall be designed to protect disturbed surface areas, including spoil disposal sites, so as not to endanger any present or future operations of either surface or underground mining activities.

AUTHORITY: section 444.530, RSMo 1994. Original rule filed Oct. 12, 1979, effective Feb. 11, 1980.*

**Original authority 1971, amended 1983, 1990, 1993.*

10 CSR 40-3.080 Requirements for the Disposal of Coal Processing Waste

PURPOSE: This rule sets forth the requirements for disposal of coal processing waste pursuant to sections 444.810, 444.855.2(13) and (22) and 444.860.2(5), RSMo.

Editor's Note: The secretary of state has determined that the publication of this rule in its entirety would be unduly cumbersome or expensive. The entire text of the rule has been filed with the secretary of state. AASHTO T99-74 is incorporated by reference as it exists on the date of adoption of this rule. The entire text of this rule may be found at the headquarters of the agency and is available to any interested person at a cost established by state law.

(1) General Requirements.

(A) All coal processing waste disposed of in an area other than the mine workings or excavations shall be hauled or conveyed and placed for final placement in new or existing disposal areas approved in the permit and plan for this purpose. These areas shall be within a permit area. The disposal area shall be designed, constructed and maintained—

1. In accordance with 10 CSR 40-3.060(1) and (2) and sections (1)–(7) of this rule; and

2. To prevent combustion.

(B) Coal processing waste materials from activities located outside a permit area, such as those activities at other mines or abandoned mine waste piles, may be disposed of in the permit area only if approved in the permit and plan. Approval shall be based on a showing by the person who conducts surface mining activities in the permit area, using hydrologic, geotechnical, physical and chemical analysis, that disposal of these materials does not—

1. Adversely affect water quality, water flow or vegetation;

2. Create public health hazards; or

3. Cause instability in the disposal areas.

(C) Refuse piles shall meet the requirements of 10 CSR 40-3.080, 30 CFR 77.214 and 30 CFR 77.215.

(2) Site Inspection.

(A) All coal processing waste banks shall be inspected, on behalf of the person conducting surface mining activities, by a qualified registered professional engineer or other qualified professional specialist under the direction of the professional engineer approved in the permit and plan. The professional engineer or specialist shall be experienced in the construction of similar earth and waste structures.

1. Inspections shall occur at least quarterly, beginning within seven (7) days after preparation of the disposal area begins. The permit and plan may require more frequent inspections based upon an evaluation of the potential danger to the health or safety of the public and the potential harm to land, air and water resources. Inspections may terminate when the coal processing waste bank has been graded, covered in accordance with section (4) of this rule, topsoil has been distributed on the bank in accordance with 10 CSR 40-3.030(4), or at a later time as the permit and plan may require.

2. Inspections shall include observations and tests as may be necessary to evaluate the potential hazard to human life and property, to ensure that all organic material and topsoil have been removed and that proper construction and maintenance are occurring in accordance with the plan submitted under 10 CSR 40-6.050(11) and approved in the permit and plan.

3. The engineer or other approved inspector shall consider steepness of slopes, seepage and other visible factors which could indicate potential failure, and the results of failure with respect to the threat to human life and property.

4. The certified report on the drainage system and protective filters shall include color photographs taken during and after construction, but before underdrains are covered with coal mine waste. If the underdrain system is constructed in phases, each phase shall be certified separately. The photographs accompanying each certified report shall be taken in adequate size and number with enough terrain or other physical features of the site shown to provide a relative scale to the photographs and to specifically and clearly identify the site.

5. Copies of the inspection findings shall be maintained at the mine site.

(B) If any inspection discloses that a potential hazard exists, the director shall be promptly informed of the finding and of the emergency procedures formulated for public protection and remedial action. If adequate procedures cannot be formulated or implemented, the director shall be notified immediately. The director shall then notify the appropriate emergency agencies that other emergency procedures are required to protect the public from the coal processing waste area.

(3) Water Control Measures.

(A) Unless the operator satisfactorily demonstrates to the director that a subdrainage system is not required to ensure the structural integrity of a coal processing waste bank

and the protection of the surface water and groundwater quality in the immediate vicinity of the disposal area, a properly designed subdrainage system shall be provided, which shall—

1. Intercept all groundwater sources;
2. Be protected by an adequate filter; and
3. Be covered so as to protect against the entrance of surface water or leachate from the coal processing waste.

(B) All surface drainage from the area above the coal processing waste bank and from the crest and face of the waste disposal area shall be diverted, in accordance with 10 CSR 40-3.060(2)(D).

(C) Slope protection shall be provided to minimize surface erosion at the site. All disturbed areas, including diversion ditches that are not riprapped, shall be vegetated upon completion of construction.

(D) All water discharged from a coal processing waste bank shall comply with 10 CSR 40-3.040(1), (2), (5), (6) and (16).

(4) Construction Requirements.

(A) The disposal facility shall be designed using current, prudent engineering practices and shall meet any design criteria established by the director. A qualified registered professional engineer experienced in the design of similar earth and waste structures shall certify the design of the disposal facilities.

(B) Coal processing waste banks shall be constructed in compliance with 10 CSR 40-3.060(1) and (2), except to the extent that the requirements of those sections are covered in this section.

(C) Coal processing waste banks shall have a minimum static safety factor of one and five tenths (1.5).

(D) Compaction requirements during construction or modification of all coal processing waste banks shall meet the requirements of this subsection, instead of those specified in 10 CSR 40-3.060(2)(C). The coal processing waste shall be—

1. Spread in layers no more than twenty-four inches (24") in thickness; and
2. Compacted to attain ninety percent (90%) of the maximum dry density to prevent spontaneous combustion and to provide the strength required for stability of the coal processing waste bank. Dry densities shall be determined in accordance with the American Association of State Highway and Transportation Officials (AASHTO) Specifications T99-74 (Twelfth Edition) (July 1978) or an equivalent method;

(E) Following grading of the coal processing waste bank, the site shall be covered with a minimum of four feet (4') of the best avail-

able nontoxic and noncombustible material, in accordance with 10 CSR 40-3.030(2)(E), and in a manner that does not impede flow from subdrainage systems. The coal processing waste bank shall be revegetated in accordance with 10 CSR 40-3.120(1)–(7). The permit or plan may allow less than four feet (4') of cover material based on physical and chemical analyses which show that the requirements of 10 CSR 40-3.120(1)–(7) will be met.

(5) Burning. Coal processing waste fires shall be extinguished by the person who conducts the surface mining activities, in accordance with a plan allowed by the permit and plan and approved by the Mine Safety and Health Administration (MSHA). The plan shall contain, at a minimum, provisions to ensure that only those persons authorized by the operator and who have an understanding of the procedures to be used shall be involved in the extinguishing operations.

(6) Burned Waste Utilization. Before any burned coal processing waste, other materials or refuse is removed from a disposal area, approval shall be obtained from the director. A plan for the method of removal, with maps and appropriate drawings to illustrate the proposed sequence of the operation and method of compliance with this chapter, shall be submitted to the director. Consideration shall be given in the plan to potential hazards, which may be created by removal, to persons working or living in the vicinity of the structure. The plan shall be certified by a qualified registered professional engineer.

(7) Return to Underground Workings. Solid coal processing waste may be returned to underground mine workings only in accordance with the waste disposal program approved in the permit and plan and the MSHA under 10 CSR 40-6.120(16).

(8) Disposal of Noncoal Wastes.

(A) Noncoal wastes including, but not limited to, grease, lubricants, paints, flammable liquids, garbage, abandoned mining machinery, lumber and other combustibles generated during surface mining activities shall be placed and stored in a controlled manner in a designated portion of the permit area. Placement and storage shall ensure that leachate and surface runoff do not degrade surface or ground water, fires are prevented and that the area remains stable and suitable for reclamation and revegetation compatible with the natural surroundings.

(B) Final disposal of noncoal wastes should be in accordance with all applicable requirements of sections 260.200–260.430, RSMo

and any other federal, state and local law applicable to disposal. The place of final disposal of noncoal waste, if in the permit area, shall be designated in the permit. Permit area disposal sites shall be designed and constructed with appropriate water barriers on the bottom and sides of the designated site. Wastes shall be routinely compacted and covered to prevent combustion and windborne waste. When the disposal is completed, a minimum of two feet (2') of soil cover shall be placed over the site, slopes stabilized and revegetation accomplished in accordance with 10 CSR 40-3.120. Operation of the disposal site shall be conducted in accordance with all local, state and federal requirements.

(C) At no time shall any solid waste material be deposited at refuse embankments or impoundment sites nor shall any excavation for solid waste disposal be located within eight feet (8') of any coal outcrop or coal storage area.

(D) Any noncoal mine waste defined as hazardous under Section 3001 of the Resource Conservation and Recovery Act (RCRA)(P.L. 94-580) and 40 CFR part 261 shall be handled in accordance with the requirements of Subtitle C of RCRA and any implementing regulations.

(9) Dams and Embankments—General Requirements.

(A) Sections (9)–(11) of this rule apply to dams and embankments, constructed of coal processing waste or intended to impound coal processing waste, whether they were completed before adoption of the regulatory program or are intended to be completed after that.

(B) Waste shall not be used in the construction of dams and embankments unless it has been demonstrated that the stability of that structure conforms with the requirements of subsection (11)(A) of this rule. It also shall be demonstrated that the use of waste material shall not have a detrimental effect on downstream water quality or the environment due to acid seepage through the dam or embankment.

(10) Dams and Embankments—Site Preparation. Before coal processing waste is placed at a dam or embankment site—

(A) All trees, shrubs, grasses and other organic material shall be cleared and grubbed from the site, and all combustibles shall be removed and stockpiled in accordance with the requirements of this chapter; and

(B) Runoff from areas above the disposal facility or runoff from the surface of the facility that may cause erosion to the embankment area or the embankment features, whether

during construction or after completion, shall be diverted away from the embankment by diversion ditches that comply with the requirements of 10 CSR 40-3.040(3). Adequate outlets for discharge from these diversions shall be in accordance with section (7). Diversions that are designed to divert drainage from the upstream area away from the impoundment area shall be designed to carry the peak runoff from a one hundred (100)-year, twenty-four (24)-hour precipitation event. The diversion shall be maintained to prevent blockage, and the discharge shall be in accordance with 10 CSR 40-3.040(7). Sediment control measures shall be provided at the discharge of each diversion ditch before entry into natural watercourses in accordance with 10 CSR 40-3.040(1)-(7).

(11) Dams and Embankments—Design and Construction.

(A) The design of each dam and embankment constructed of coal processing waste or intended to impound waste shall comply with the requirements of 10 CSR 40-3.040(10)(A)5. and 10 CSR 40-3.040(10)(E)-(K), modified as follows:

1. The design freeboard between the lowest point on the embankment crest and the maximum water elevation shall be at least three feet (3'). The maximum water elevation shall be that determined by the freeboard hydrograph criteria contained in the United States Soil Conservation Service criteria referenced in 10 CSR 40-3.040(10);

2. The dam and embankment shall have a minimum safety factor of one and five-tenths (1.5) for the partial pool with steady seepage saturation conditions and the seismic safety factor shall be at least one and two-tenths (1.2); and

3. The dam or embankment foundation and abutments shall be designed to be stable under all conditions of construction and operation of the impoundment. Sufficient foundation investigations and laboratory testing shall be performed to determine the safety factors of the dam or embankment for all loading conditions appearing in paragraph (11)(A)2. of this rule or the publications referred to in 10 CSR 40-3.040(10) and for all increments of construction.

(B) Spillways and outlet works shall be designed to provide adequate protection against erosion and corrosion. Inlets shall be protected against blockage.

(C) Dams or embankments constructed of, or impounding, waste materials shall be designed so that at least ninety percent (90%) of the water stored during the design precipitation event is removed within a ten (10)-day period.

(D) Dams or embankments constructed of, or impounding, waste materials may not be retained permanently as part of the approved postmining land use.

AUTHORITY: sections 444.530 and 444.810, RSMo Supp. 1999. Original rule filed Oct. 12, 1979, effective Feb. 11, 1980. Amended: Filed Aug. 8, 1980, effective Dec. 11, 1980. Amended: Filed Dec. 10, 1980, effective April 11, 1981. Amended: Filed Sept. 15, 1988, effective Jan. 15, 1989. Amended: Filed July 3, 1990, effective Nov. 30, 1990. Amended: Filed May 15, 1992, effective Jan. 15, 1993. Amended: Filed Sept. 15, 1994, effective April 30, 1995. Amended: Filed March 21, 2000, effective Oct. 30, 2000.*

**Original authority: 444.530, RSMo 1971, amended 1983, 1990, 1993, 1995; and 444.810, RSMo 1979, amended 1983, 1993, 1995.*

10 CSR 40-3.090 Requirements for the Protection of Air Resources

PURPOSE: This rule sets forth the requirements for the protection of air resources pursuant to section 444.810, RSMo.

The surface coal mining and reclamation operations shall comply with all applicable state and federal air pollution control laws. All exposed surface areas shall be protected and stabilized to effectively control erosion and air pollution attendant to erosion according to 10 CSR 40-3.040(5)(A).

AUTHORITY: section 444.530, RSMo Supp. 1999. Original rule filed Oct. 12, 1979, effective Feb. 11, 1980. Amended: Filed Dec. 10, 1980, effective April 11, 1981. Amended: Filed March 21, 2000, effective Oct. 30, 2000.*

**Original authority: 444.530, RSMo 1971, amended 1983, 1990, 1993.*

10 CSR 40-3.100 Requirements for the Protection of Fish, Wildlife and Related Environmental Values and Protection Against Slides and Other Damage

PURPOSE: This rule sets forth the requirements for the protection of fish, wildlife and related environmental values and the protection against slides and other damage pursuant to sections 444.810 and 444.855.2(24), RSMo.

Editor's Note: The secretary of state has determined that the publication of this rule in its entirety would be unduly cumbersome or

expensive. The entire text of the rule has been filed with the secretary of state. Environmental Criteria for Electric Transmission System (USDI, USDA (1970)) and REA Bulletin 61-10, Powerline Contacts by Eagles and Other Large Birds are incorporated by reference as they exist on the date of adoption of this rule. The entire text of this rule may be found at the headquarters of the agency and is available to any interested person at a cost established by state law.

(1) Any person conducting surface mining activities, to the extent possible using the best technology currently available, shall minimize disturbances and adverse impacts of the activities on fish, wildlife and related environmental values and achieve enhancement of these resources where practicable.

(2) Endangered and Threatened Species. No surface mining activity shall be conducted which is likely to jeopardize the continued existence of endangered or threatened species listed by the Missouri Department of Conservation and the United States Fish and Wildlife Service or which is likely to result in the destruction or adverse modification of designated critical habitats of the species in violation of the Endangered Species Act (16 U.S.C. 1531). A person who conducts surface mining activities promptly shall report to the director the presence in the permit area of any critical habitat of a threatened or endangered species listed by the secretary of the interior, any plant or animal listed as threatened or endangered by the state, or any bald or golden eagle of which that person becomes aware and which was not previously reported to the director by that person. Upon notification, the director shall consult with the Missouri Department of Conservation and the United States Fish and Wildlife Service and, after consultation, shall identify whether and under what conditions the operator may proceed.

(3) A person who conducts surface mining activities shall ensure that the design and construction of electric power lines and other transmission facilities used for or incidental to the surface mining activities on the permit area are in accordance with the guidelines set forth in *Environmental Criteria for Electric Transmission System* (USDI, USDA (1970)), incorporated by reference, or in alternative guidance manuals approved in the permit and plan. Distribution lines shall be designed and constructed in accordance with REA Bulletin 61-10, *Powerline Contacts by Eagles and Other Large Birds*, incorporated by refer-

ence, or in alternative guidance manuals approved in the permit and plan.

(4) To the extent possible using the best technology currently available, each person who conducts surface mining activities shall—

(A) Locate and operate haul and access roads so as to avoid or minimize impacts to important fish and wildlife species or other species protected by state or federal law;

(B) Fence roadways where specified in the permit and plan to guide locally important wildlife to roadway underpasses or overpasses and construct the necessary passages. No new barrier shall be created in known and important wildlife migration routes;

(C) Fence, cover or use other appropriate methods to exclude wildlife from ponds which contain hazardous concentrations of toxic-forming materials;

(D) Restore, enhance where practicable or avoid disturbance to habitats of unusually high value for fish and wildlife;

(E) Restore, enhance where practicable or maintain natural riparian vegetation on the banks of streams, lakes and other wetland areas;

(F) Afford protection to aquatic communities by avoiding stream channels as required in 10 CSR 40-3.040(18) or by restoring stream channels as required in 10 CSR 40-3.040(4);

(G) Not use persistent pesticides on the area during surface mining and reclamation activities unless approved in the permit and plan; and

(H) Prevent, control and suppress, to the extent possible, range, forest and coal fires which are not approved in the permit and plan as part of a management plan.

(5) If fish and wildlife habitat is to be a primary or secondary postmining land use, the operator, in addition to the requirements of 10 CSR 40-3.120(1)–(7) shall—

1. Select plant species to be used on reclaimed areas, based on the following criteria:

A. Their proven nutritional value for fish and wildlife;

B. Their uses as cover for fish and wildlife; and

C. Their ability to support and enhance fish and wildlife habitat after release of bonds; and

2. Distribute plant groupings to maximize benefit to fish and wildlife. Plants should be grouped and distributed in a manner which optimizes edge effect, cover and other benefits for fish and wildlife.

(6) Where cropland is to be the alternative postmining land use on lands diverted from a fish and wildlife premining land use and where appropriate for wildlife and crop management practices, the reclaimed lands shall be interspersed with trees, hedges or fence rows throughout the harvested area to break up large blocks of monoculture and to diversify habitat types for birds and other animals. Wetlands shall be preserved or created rather than drained or otherwise permanently abolished.

(7) Where the primary land use is to be residential, public service or industrial land use, reclaimed land shall be interspersed with greenbelts utilizing species of grass, shrubs and trees useful as food and cover for birds and small animals, unless the greenbelts are inconsistent with the approved postmining land use.

(8) Stability Barriers.

(A) An undisturbed natural barrier shall be provided beginning at the elevation of the lowest coal seam to be mined and extending from the outslope for a distance as may be determined in the permit and plan as is needed to assure stability. The barrier shall be retained in place to prevent slides and erosion.

(B) At any time a slide occurs, which may have a potential adverse effect on public property, health, safety or the environment, the person who conducts the surface mining activities shall notify the director by the fastest available means and comply with any remedial measures required in the permit and plan.

AUTHORITY: sections 444.530 and 444.810, RSMo 1994. Original rule filed Oct. 12, 1979, effective Feb. 11, 1980. Amended: Filed Aug. 8, 1980, effective Dec. 11, 1980. Amended: Filed Dec. 15, 1987, effective April 1, 1988. Amended: Filed Sept. 15, 1988, effective Jan. 15, 1989. Amended: Filed May 15, 1992, effective Jan. 15, 1993. Amended: Filed Sept. 15, 1995, effective April 30, 1995.*

**Original authority: 444.530, RSMo 1971 amended 1983, 1990, 1993, 1995; and 444.810, RSMo 1979, amended 1983, 1993, 1995.*

10 CSR 40-3.110 Backfilling and Grading Requirements

PURPOSE: This rule sets forth the requirements for backfilling and grading pursuant to

sections 444.810, 444.855.2(3) and .3, RSMo.

(1) General.

(A) Timing of Backfilling and Grading.

1. Contour mining. Rough backfilling and grading shall follow coal removal by not more than sixty (60) days or one thousand five hundred (1500) linear feet. The director may grant additional time for rough backfilling and grading if the permittee can demonstrate, through a detailed written analysis under 10 CSR 40-6.050(8)(B)3., that additional time is necessary.

2. Open pit mining with thin overburden. Rough backfilling and grading shall occur in accordance with the time schedule approved in the permit and plan, on the basis of the materials submitted under 10 CSR 40-6.050(8)(B)3., which shall specifically establish in stated increments the period between removal of coal and completion of backfilling and grading.

3. Area strip mining. Rough backfilling and grading either shall be—

A. Completed within one hundred eighty (180) days following coal removal and shall not be more than four (4) spoil ridges behind the pit being worked, the spoil from the active pit being considered the first ridge; or

B. Not more than three (3) spoil ridges behind the pit being worked, the spoil from the active pit being considered the first ridge. If the pit becomes inactive for a period longer than thirty (30) days and an alternate schedule is not approved, the pit must be backfilled and graded within one hundred eighty (180) days of cessation of operations.

4. Either of the previous two (2) rough backfilling and grading schedules shall be applicable to all areas on a mine with the backfilling and grading schedule for each specific area identified in the permit;

5. Additional time, spoil ridges, or both, for rough backfilling and grading may be granted by the director if the permittee can demonstrate in a detailed written analysis, including specific schedules and plans, that additional time or spoil ridges is necessary.

6. Active areas such as roads, ramps, parking areas, stockpiles and boxcut spoil, which area is shown on an approved operations plan map, are not subject to the backfilling and grading time frames until they become inactive or unless they are part of a variance schedule.

(B) Method for Backfilling and Grading.

1. Except as specifically exempted in this chapter, all disturbed areas shall be

returned to their approximate original contour. All spoil shall be transported, backfilled, compacted (where advisable to ensure stability or to prevent leaching) and graded to eliminate all highwalls, spoil piles and depressions.

2. Backfilled material shall be placed to minimize adverse effects on groundwater, minimize off-site effects and to support the approved postmining land use.

3. The postmining graded slopes need not be of uniform slope.

4. Cut-and-fill terraces may be used only in those situations expressly identified in section (2) of this rule.

(2) General Grading Requirements.

(A) The final graded slopes shall not exceed in grade either the approximate premining slopes or any lesser slopes approved in the permit and plan based on consideration of soil, climate or other characteristics of the surrounding area. Postmining final graded slopes need not be uniform but shall approximate the general nature of the premining topography. The requirements of this section may be modified in the permit and plan where the surface mining activities are re-affecting previously mined lands that have not been restored to the standards of this chapter and sufficient spoil is not available to otherwise comply with this section. The person who conducts surface mining activities, at a minimum, shall—

1. Retain all overburden and spoil on the solid portion of existing or new benches; and

2. Backfill and grade to the most moderate slope possible, to eliminate the highwall which does not exceed either the angle of repose or a lesser slope as is necessary to achieve a minimum static safety factor of one and three-tenths (1.3). In all cases the highwall shall be eliminated.

(B) On approval in the permit and plan in order to conserve soil moisture, ensure stability and control erosion on final graded slopes, cut-and-fill terraces may be allowed if the terraces are compatible with the approved postmining land use and are appropriate substitutes for construction of lower grades on the reclaimed lands. The terraces shall meet the following requirements:

1. The slope of the individual terrace bench shall not exceed twenty feet (20') unless specifically approved in the permit and plan as necessary for stability, erosion control or roads included in the approved postmining land use plan;

2. The vertical distance between terraces shall be as specified in the permit and plan, to prevent excessive erosion and to provide long-term stability;

3. The slope of the terrace outslope shall not exceed 1v:2h (50%). Outslopes which exceed 1v:2h (50%) may be approved, if they have a minimum static safety factor of more than one and three-tenths (1.3), provide adequate control over erosion and closely resemble the surface configuration of the land prior to mining. In no case may highwalls be left as part of terraces; and

4. Culverts and underground rock drains shall be used on the terrace only when approved in the permit and plan.

(C) Small depressions may be constructed, if they—

1. Are approved in the permit and plan to minimize erosion, conserve soil moisture or promote vegetation;

2. Do not restrict normal access; and

3. Are not inappropriate substitutes for lower grades on the reclaimed lands.

(D) All surface mining activities on slopes above twenty degrees (20°) or on lesser slopes that the permit and plan defines as steep slopes shall meet the provisions of 10 CSR 40-4.040.

(E) All final grading, preparation of overburden before replacement of topsoil and placement of topsoil shall be done along the contour to minimize subsequent erosion and instability. If this grading, preparation, or placement along the contour is unnecessary or is hazardous to equipment operations, then grading, preparation or placement in a direction other than generally parallel to the contour may be used if approved in the permit and plan. In all cases, grading, preparation or placement shall be conducted in a manner which minimizes erosion and provides a surface for replacement of topsoil which will minimize slippage.

(3) Covering Coal Seams, Combustible and Acid-Forming and Toxic-Forming Materials.

(A) Cover.

1. Exposed coal seams, acid-forming and toxic-forming materials and combustible materials exposed, used or produced during mining shall be adequately covered with nontoxic and noncombustible material or treated, to control the impact on surface and ground water in accordance with 10 CSR 40-3.040, to prevent sustained combustion and to minimize adverse effects on plant growth and the approved postmining land use. Coal processing waste and noncoal waste shall be covered in accordance with 10 CSR 40-3.080.

2. Where necessary to protect against upward migration of salts, exposure to erosion, formation of acid or toxic seeps, to provide an adequate depth for plant growth or otherwise to meet local conditions, the permit and plan shall specify thicker amounts of

cover using nontoxic material, or special compaction and isolation from groundwater contact.

3. Acid-forming or toxic-forming material, combustible materials and coal processing waste shall not be buried or stored in proximity to a drainage course so as to cause or pose a threat of water pollution.

(B) Stabilization. Backfilled materials shall be selectively hauled or conveyed and compacted, wherever necessary, to prevent leaching of acid- and toxic-forming materials into surface or ground waters and wherever necessary to ensure stability of the backfilled materials. The method and design specifications of compacting material shall be approved in the permit and plan before acid- or toxic-forming materials are covered.

(4) Thin Overburden.

(A) The provisions of this section apply only where there is insufficient spoil and other waste materials available from the entire permit area to restore the disturbed area to its approximate original contour. Insufficient spoil and other waste materials occur where the overburden thickness times the swell factor, plus the thickness of other available waste materials, is less than the combined thickness of the overburden and coal bed prior to removing the coal, so that after backfilling and grading the surface configuration of the reclaimed area would not:

1. Closely resemble the surface configuration of the land prior to mining; or

2. Blend into and complement the drainage pattern of the surrounding terrain. The provisions of this section apply only when surface mining activities cannot be carried out to comply with section (1) of this rule to achieve the approximate original contour.

(B) In surface mining activities carried out continuously in the same limited pit area for more than one (1) year from the day coal-removal operations begin and where the volume of all available spoil and suitable waste materials over the mine plan area is demonstrated to be insufficient to achieve the approximate original contour of the lands disturbed, surface mining activities shall be conducted to meet, at a minimum, the following standards:

1. Haul or convey, backfill and grade, using all available spoil and suitable waste materials from the entire mine area, to attain the lowest practicable stable grade, to achieve a static safety factor of one and three-tenths (1.3), and to provide adequate drainage and long-term stability of the regraded areas and cover all acid- and toxic-forming materials;

2. Eliminate highwalls by grading or backfilling to stable slopes not exceeding 1v:2h (50%) or lesser slopes as may be specified in the permit and plan to reduce erosion, maintain the hydrologic balance or allow the approved postmining land use;

3. Haul or convey, backfill, grade and revegetate, in accordance with 10 CSR 40-3.120(1)–(7), to achieve an ecologically sound land use compatible with the prevailing use in unmined areas surrounding the mine plan area; and

4. Haul or convey, backfill and grade, to ensure impoundments are constructed only where—

A. It has been demonstrated that all requirements of 10 CSR 40-3.040(1)–(16) have been met; and

B. The impoundments have been approved in the permit and plan as suitable for the approved postmining land use as meeting the requirements of this chapter and all other applicable federal and state laws and regulations.

(5) Thick Overburden.

(A) The provisions of this section apply only where there is more than sufficient spoil and other waste materials available from the entire permit area to restore the disturbed area to its approximate original contour. More than sufficient spoil and other waste materials occur where the overburden thickness times the swell factor exceeds the combined thickness of the overburden and coal bed prior to removing the coal, so that after backfilling and grading the surface configuration of the reclaimed area would not:

1. Closely resemble the surface configuration of the land prior to mining; or

2. Blend into and complement the drainage pattern of the surrounding terrain. The provisions of this section apply only when surface mining activities cannot be carried out to comply with section (1) of this rule to achieve the approximate original contour.

(B) In surface mining activities where the volume of spoil over the mine plan area is demonstrated to be more than sufficient to achieve the approximate original contour, surface mining activities shall be conducted to meet, at a minimum, the following standards:

1. Haul or convey, backfill and grade all spoil and wastes not required to achieve the approximate original contour of the mine plan area, to the lowest practicable grade, to achieve the static factor of safety of one and three-tenths (1.3) and cover all acid-forming and other toxic-forming materials;

2. Haul or convey, backfill and grade excess spoil and wastes only within the permit area and dispose of those materials in accordance with 10 CSR 40-3.060(1)–(4);

3. Haul or convey, backfill and grade excess spoil and wastes to maintain the hydrologic balance, in accordance with sections 10 CSR 40-3.040(1)–(17), and to provide long-term stability by preventing slides, erosion and water pollution;

4. Haul or convey, backfill, grade and revegetate wastes and excess spoil to achieve an ecologically sound land use approved in the permit and plan as compatible with the prevailing land uses in unmined areas surrounding the mine plan area;

5. Eliminate all highwalls and depressions by backfilling with spoil and suitable waste materials; and

6. Meet the revegetation requirements of 10 CSR 40-3.120(1)–(7) for all disturbed areas.

(6) Regrading or Stabilizing Rills and Gullies.

(A) When rills or gullies deeper than nine inches (9") form in areas that have been regraded and topsoiled, the rills and gullies shall be stabilized as soon as weather and soil conditions permit by use of temporary or permanent measures. Rills and gullies deeper than nine inches (9") which have formed prior to August 1 of any year and which either 1) disrupt the approved postmining land use or the reestablishment of the vegetative cover, or 2) cause or contribute to a violation of water quality standards for receiving streams shall be filled, graded and topsoiled by September 1 of each year and reseeded or replanted according to 10 CSR 40-3.120(1)–(7) as soon as weather and soil conditions permit, but no later than September 30 of each year. Rills and gullies of lesser depth which have formed prior to August 1 of any year must be permanently or temporarily stabilized as soon as weather and soil conditions permit and permanently repaired and topsoiled, if in a topsoiled area, by September 30 of each year if the rills and gullies disrupt the approved land use or the reestablishment of a vegetative cover or cause or contribute to a violation of water quality standards for receiving stream.

(B) On areas that have been previously mined, the requirements for regrading or stabilizing rills and gullies pursuant to subsection (6)(A) apply after final grading and placement of topsoil or the best available topsoil substitute.

*AUTHORITY: sections 444.530 and 444.810, RSMo Supp. 1999. * Original rule filed Oct.*

12, 1979, effective Feb. 11, 1980. Amended: Filed Dec. 10, 1980, effective April 11, 1981. Amended: Filed June 27, 1986, effective Jan. 12, 1987. Amended: Filed Aug. 14, 1986, effective Feb. 28, 1987. Amended: Filed Sept. 15, 1988, effective Jan. 15, 1989. Amended: Filed July 3, 1990, effective Nov. 30, 1990. Amended: Filed May 15, 1992, effective Jan. 15, 1993. Amended: Filed Sept. 15, 1994, effective April 30, 1995. Amended: Filed March 21, 2000, effective Oct. 30, 2000.

**Original authority: 444.530, RSMo 1971 amended 1983, 1990, 1993, 1995; and 444.810, RSMo 1979, amended 1983, 1993, 1995.*

10 CSR 40-3.120 Revegetation Requirements

PURPOSE: This rule sets forth revegetation requirements pursuant to sections 444.810 and 444.855.2(19) and (20), RSMo.

Editor's Note: The secretary of state has determined that the publication of this rule in its entirety would be unduly cumbersome or expensive. The entire text of the material referenced has been filed with the secretary of state. This material may be found at the Office of the Secretary of State or at the headquarters of the agency and is available to any interested person at a cost established by state law.

(1) General Requirements.

(A) The permittee shall establish on regraded areas and on all other disturbed areas, except water areas and surface areas of roads that are approved as part of the postmining land use, a vegetative cover that is in accordance with the approved permit and reclamation plan and that is to be—

1. Diverse, effective and permanent;

2. Comprised of species native to the area, or of introduced species where allowable under section (2) of this rule, and necessary to achieve the approved postmining land use and approved by the regulatory authority;

3. At least equal in extent of cover to the natural vegetation of the area; and

4. Capable of stabilizing the soil surface from erosion.

(B) The reestablished plant species shall—

1. Be compatible with the approved postmining land use;

2. Have the same seasonal characteristics of growth as the original vegetation;

3. Be capable of self-regeneration and plant succession;

4. Be compatible with the plant and animal species of the area; and

5. Meet the requirements of applicable state and federal seed, poisonous and noxious plant and introduced species laws or regulations.

(C) For areas designated as prime farmland, the requirements of 10 CSR 40-4.030 shall apply.

(D) The regulatory authority may grant exception to the requirements of paragraphs (1)(B)2. and 3. of this rule when the species are necessary to achieve a quick-growing, temporary, stabilizing cover and measures to establish permanent vegetation are included in the approved permit and reclamation plan.

(E) When the regulatory authority approves a cropland or prime farmland postmining land use, the regulatory authority may grant exception to the requirements of paragraphs (1)(A)1. and 3., and (1)(B)2. and 3. of this rule.

(2) Use of Introduced Species. Introduced species may be substituted for native species only if approved in the permit and plan under the following conditions:

(A) After appropriate field trials have demonstrated that the introduced species are desirable and necessary to achieve the approved postmining land use;

(B) The species are necessary to achieve a quick, temporary and stabilizing cover that aids in controlling erosion; and measures to establish permanent vegetation are included in the approved plan submitted under 10 CSR 40-6.050(8)(B)3. and 10 CSR 40-6.050(10);

(C) The species are compatible with the plant and animal species of the region; and

(D) The species meet the requirements of applicable state and federal seed or introduced species statutes and are not poisonous or noxious.

(3) Timing. Seeding and planting of disturbed areas shall be conducted during the first normal period for favorable planting conditions after final preparation. The normal period for favorable planting shall be that planting time generally accepted locally for the type of plant materials selected. When necessary to effectively control erosion, any disturbed area shall be seeded and planted, as contemporaneously as practicable with the completion of backfilling and grading, with a temporary cover of small grains, grasses or legumes until a permanent cover is established.

(4) Mulching and Other Soil Stabilizing Practices.

(A) Suitable mulch and other soil stabilizing practices shall be used on all regraded and topsoiled areas to control erosion, pro-

mote germination of seeds or increase the moisture-retention capacity of the soil. The commission or director, on a case-by-case basis, may suspend the requirement for mulch, if the permittee can demonstrate that alternative procedures will achieve the requirements of section (6) of this rule and do not cause or contribute to air or water pollution.

(B) When required in the permit and plan, mulches shall be mechanically or chemically anchored to the soil surface to assure effective protection of the soil and vegetation.

(C) Annual grasses and grains may be used alone as *in situ* mulch, or in conjunction with another mulch, when the commission or director determines that they will provide adequate soil erosion control and will later be replaced by perennial species approved for the postmining land use.

(D) Chemical soil stabilizers alone, or in combination with appropriate mulches, may be used in conjunction with vegetative covers approved for the postmining land use.

(5) Grazing. When the approved postmining land use is pasture, the reclaimed land may be used for livestock grazing at a grazing capacity approved in the permit and plan approximately equal to that for similar nonmined lands, for at least the last two (2) full years of liability required under subsection (6)(B) of this rule or may be used in another manner, as approved, which will determine the productive capacity approved in the permit and plan approximately equal to that for similar nonmined lands.

(6) Standards for Success.

(A) Success of revegetation shall be measured by statistically valid techniques and in accordance with guidelines established by the director and referenced under paragraph (6)(B)2. of this rule. Comparison of ground cover and productivity may be made on the basis of reference areas or criteria representative of unmined lands in the area being reclaimed or through the use of technical guidance procedures published by the United States Department of Agriculture (USDA) or United States Department of Interior (USDI) for assessing ground cover and productivity. Management of the reference area, if applicable, shall be comparable to that which is required for the approved postmining land use of the permit area.

(B) General Requirements.

1. Ground cover and productivity of living plants on the revegetated area within the permit area shall be equal to the ground cover and productivity of living plants on the approved reference area or to the standards in

other technical guides approved by the commission for use in the regulatory program. The period of extended responsibility initiates after the last year of augmented seeding, fertilizing, irrigation or other work which ensures success and continues for not fewer than five (5) years.

2. Specific standards for postmining land uses—

A. For areas to be used as woodland, success in revegetation shall be determined on the basis of ground cover and tree and shrub count. Ground cover and tree and shrub stocking shall be considered acceptable if they are equal to ninety percent (90%) of the approved success standard at a ninety percent (90%) statistical confidence level for the last year of the five (5)-year responsibility period. The success standard for ground cover is a ground cover density of seventy percent (70%). The success standard for tree and shrub stocking rate shall be determined on a specific permit basis with consultation and approval of the Missouri Department of Conservation. Measurements for ground cover and productivity of living plants shall be performed in accordance with the criteria contained in the current guidelines of the Land Reclamation Commission entitled “Phase III Revegetation Success Standards for Woodland”;

B. In areas to be developed for industrial/commercial land use fewer than two (2) years after regrading is completed, the vegetative ground cover shall not be less than required to control erosion. If the area is not developed for industrial/commercial use within two (2) years of regrading, ground cover must have a density of seventy percent (70%), at a ninety percent (90%) statistical confidence level and not be less than that required to control erosion. Measurements for ground cover shall be performed in accordance with the criteria contained in the current guidelines of the Land Reclamation Commission entitled “Phase III Success Standards for Industrial/Commercial Revegetation”;

C. For areas to be used for cropland unless otherwise approved in the permit and plan, success in revegetation of cropland shall be determined on the basis of crop production from the mined area as compared to approved reference areas or other technical guidance procedures. Crop production from the mined area shall be equal to or greater than that of the approved standard for any two (2) years, except the first year, of the five (5)-year liability period established in paragraph (6)(B)1. of this rule. Production shall not be considered equal if it is less than ninety percent (90%) of the production of the approved

standard with ninety percent (90%) statistical confidence. Measurements for crop productivity shall be performed in accordance with the criteria contained in the current guidelines of the Land Reclamation Commission entitled “Phase III Revegetation Success Standards for Cropland”;

D. On areas to be developed for wildlife habitat, success of vegetation shall be determined on the basis of tree, shrub or half-shrub stocking and ground cover. The tree, shrub or half-shrub stocking shall meet the standards described in section (7) of this rule. Ground cover shall be considered acceptable if it has at least seventy percent (70%) density with ninety percent (90%) statistical confidence. The success standard for tree and shrub stocking rate shall be determined on a specific permit basis with consultation and approval of the Missouri Department of Conservation. Measurements for ground cover and stocking shall be performed in accordance with the criteria contained in the current guidelines of the Land Reclamation Commission entitled “Phase III Revegetation Success Standards for Wildlife Habitat”;

E. For areas to be developed for pasture use, success of revegetation shall be determined on the basis of ground cover and the production of living plants. Ground cover and production shall be considered acceptable if they are at least ninety percent (90%) of the approved success standard at a ninety percent (90%) statistical confidence level for any two (2) years of the five (5)-year responsibility period, except the first year. The success standard for ground cover shall be ninety percent (90%) density. The success standard for hay production shall be the yield from the reference area. Measurements for ground cover and productivity of living plants shall be performed in accordance with the criteria contained in the current guidelines of the Land Reclamation Commission entitled “Phase III Revegetation Success Standards for Pasture and Previously Mined Areas”;

F. For areas to be developed for prime farmland use, success of revegetation shall be determined on the basis of crop production. Crop production shall be considered acceptable if it is one hundred percent (100%) of the approved success standard at a ninety percent (90%) statistical confidence level for any three (3) years of the five (5)-year responsibility period, except the first year. The success standard for crop production shall be the yield from the reference area or other technical guidance procedures. Measurement of soil productivity shall be initiated within ten (10) years after completion of soil replacement. Measurements for crop productivity shall be performed in accordance with the

criteria contained in 10 CSR 40-4.030 and in the current guidelines of the Land Reclamation Commission entitled “Phases II/III Revegetation Success Standards For Prime Farmland”;

G. For areas to be developed for a recreation land use, success of revegetation shall be determined on the basis of ground cover and tree and shrub stocking. Ground cover shall be considered acceptable if it is equal to a density of seventy percent (70%), at a ninety percent (90%) statistical confidence level. The success standard for tree and shrub stocking rate shall be determined on a specific permit basis with consultation and approval of the Missouri Department of Conservation. Measurements for ground cover and productivity of living plants shall be performed in accordance with the criteria contained in the current guidelines of the Land Reclamation Commission entitled “Phase III Revegetation Success Standards For a Recreation Land Use”;

H. For areas to be developed for residential use fewer than two (2) years after regrading is completed, the vegetative ground cover density shall not be less than required to control erosion. If the area is not developed for residential use within two (2) years of regrading, ground cover must be equal to a density of seventy percent (70%), at a ninety percent (90%) statistical confidence level. Measurements for ground cover density shall be performed in accordance with the criteria contained in the current guidelines of the Land Reclamation Commission entitled “Program Phase III Revegetation Standards For Residential Land Use”; and

I. For areas previously disturbed by mining that were not reclaimed to the requirements of subsection (6)(B) and that are re-mined or otherwise redisturbed by surface coal mining operations, as a minimum, the vegetative ground cover shall be not less than the ground cover existing before redisturbance and shall be adequate to control erosion.

3. Vegetative ground cover shall not be less than that required to achieve the approved postmining land use.

(C) The person who conducts surface mining activities shall—

1. Maintain any necessary fences and proper management practices; and

2. Conduct periodic measurements of vegetation, soils and water prescribed or approved in the permit and plan to identify conditions during the applicable period of liability specified in subsection (6)(B) of this rule.

(D) For permit areas forty (40) acres or less in size in locations with an average annu-

al precipitation of more than twenty-six inches (26”), the following performance standards, if approved in the permit and plan, may be used instead of reference areas to measure success of revegetation on sites that are disturbed. These standards shall be met for a minimum of five (5) consecutive years:

1. Areas planted only in herbaceous species shall sustain a vegetative ground cover of seventy percent (70%) for five (5) full consecutive years;

2. Areas planted with a mixture of herbaceous and woody species shall sustain a herbaceous vegetative ground cover of seventy percent (70%) for five (5) full consecutive years and four hundred (400) woody plants per acre after five (5) years. On steep slopes, the minimum number of woody plants shall be six hundred (600) per acre; and

3. For purposes of this section, herbaceous species means grasses, legumes and nonleguminous forbs; woody plants means woody shrubs, trees and vines; and ground cover means the area of ground covered by the combined aerial parts of vegetation and the litter that is produced naturally on-site, expressed as a percentage of the total area of measurement.

(7) Tree and Shrub Stocking for Woodland, Wildlife Habitat and Recreation Land Uses. This section sets forth forest resource conservation standards for reforestation operations to ensure that a cover of commercial tree species, noncommercial tree species, shrubs or half-shrubs, sufficient for adequate use of the available growing space, is established after surface mining activities.

(A) Stocking, that is, the number of stems per unit area, will be used to determine the degree to which space is occupied by well-distributed, countable trees, shrubs or half-shrubs.

1. Root crown or root sprouts over one foot (1') in height shall count as one (1) toward meeting the stocking requirements. Where multiple stems occur, only the tallest stem will be counted.

2. A countable tree or shrub means a tree that can be used in calculating the degree of stocking under the following criteria:

A. The tree or shrub shall be in place at least two (2) growing seasons;

B. The tree or shrub shall be alive and healthy; and

C. The tree or shrub shall have at least one-third (1/3) of its length in live crown.

3. Rock areas, permanent road and surface water drainage ways on the revegetated area shall not require stocking.

(B) The following are the minimum performance standards for areas where woodland is the approved postmining land use:

1. The area shall have a minimum stocking of four hundred fifty (450) trees or shrubs per acre;

2. A minimum of seventy-five percent (75%) of countable trees or shrubs shall be commercial tree species;

3. The number of trees or shrubs and the ground cover shall be determined using procedures described in subparagraph (6)(B)2.D. and subsection (7)(A) of this rule and the sampling method approved in the permit and plan; when the stocking is equal to or greater than four hundred fifty (≥ 450) trees or shrubs per acre and there is acceptable ground cover, the five (5)-year responsibility period required in subparagraph (6)(B)2.D. and paragraph (7)(C)2. of this rule shall begin; and

4. Upon expiration of the five (5)-year responsibility period and at the time of request for bond release, each permittee shall provide documentation showing that the stocking of trees and shrubs and the ground cover on the revegetated area is satisfied by the provisions set out in subparagraph (6)(B)2.D. and paragraph (7)(B)1. of this rule.

(C) The following are the minimum performance standards for areas where woody plants are used for wildlife management, recreation, shelter belts or forest uses other than commercial forest land:

1. An inventory of trees, half-shrubs and shrubs shall be conducted on established reference areas according to methods approved in the permit and plan. This inventory shall contain, but not be limited to—

- A. Site quality;
- B. Stand size;
- C. Stand condition;
- D. Site and species relations; and
- E. Appropriate forest land utilization considerations;

2. The stocking of trees, shrubs, half-shrubs and the ground cover established on the revegetated area shall approximate the stocking and ground cover approved in the permit. Minimum stocking and planting arrangements shall be based on local and regional conditions after consultation with and approval from the Missouri Department of Conservation. The stocking of live woody plants shall be equal to or greater than ninety percent (90%) of the stocking of woody plants of the same life form approved in the permit. When this requirement is met and acceptable ground cover is achieved, the five (5)-year responsibility period required in subsection (6)(B) of this rule shall begin; and

3. Upon expiration of the five (5)-year responsibility period, each permittee shall provide documentation showing that—

A. The woody plants established on the revegetated site are equal to or greater than ninety percent (90%) of the stocking rate approved in the permit with ninety percent (90%) statistical confidence and, at the time of final bond release, at least eighty percent (80%) of the trees and shrubs used to determine success shall have been in place for sixty percent (60%) of the applicable minimum period of responsibility;

B. The ground cover on the revegetated area satisfies subparagraph (6)(B)2.D. of this rule. Species diversity, seasonal variety and regenerative capacity of the vegetation of the revegetated area shall be evaluated on the basis of the results which could reasonably be expected using the revegetation methods described in the mining and reclamation plan; and

C. Vegetative ground cover shall not be less than that required to achieve the approved postmining land use.

(8) Reclamation Schedule.

(A) In addition to the temporal and spatial requirements for completion of grading specified in 10 CSR 40-3.110(1)(A), other aspects of reclamation shall be completed in a timely manner as follows:

1. Replacement of topsoil shall be completed within two hundred seventy (270) days of the completion of backfilling and rough grading or as contemporaneously as possible as defined in the approved permit;

2. A permanent cover sufficient to control erosion, or an equivalent erosion control practice, as approved by the director, shall be in place within two (2) years of the completion of initial seeding;

3. Within four (4) years of the completion of initial seeding—

A. Reclaimed land shall qualify for a Phase II liability release; and

B. The permittee shall submit a request for release of Phase II liability;

4. Siltation structures and diversions that are no longer needed for control of sediment shall be graded, topsoiled and seeded within eighteen (18) months after approval of a Phase II liability release of all disturbed areas within the watershed they serve. These Siltation structures and diversions shall be clearly indicated by the director in the Phase II liability release inspection report;

5. Revegetation success on industrial/commercial areas, public service areas, recreation areas and residential areas shall be demonstrated in the last year of the five (5)-year responsibility period;

6. Revegetation success on woodland areas and wildlife areas shall be demonstrated in the last year of the five (5)-year responsibility period;

7. Revegetation success on cropland and pasture shall be demonstrated in any two (2) years of the last four (4) years of the five (5)-year responsibility period;

8. Revegetation success on prime farmland shall be demonstrated in any three (3) years of the last four (4) years of the five (5)-year responsibility period;

9. Measurements of ground cover, productivity and tree and shrub density shall be submitted to the commission within thirty (30) days of data collection for the years the permittee uses to prove revegetation success. If a permittee is unable to demonstrate revegetation success at the end of the five (5)-year responsibility period, the responsibility period and the requirement to measure productivity shall be extended year-by-year until the revegetation success standards are met; and

10. Within six (6) months after revegetation success is demonstrated for a given area—

A. All requirements of 10 CSR 40-7.021(2)(D) shall be met; and

B. The permittee shall submit a request for release of Phase III liability to the commission.

(B) The requirements of subsection (8)(A) shall not apply to areas that are used and needed specifically for the support of ongoing reclamation or mining activities and on which grading, topsoiling, or both cannot be completed until the areas are no longer needed for the support of ongoing reclamation or mining activities. The areas shall include, but shall not be limited to, haul roads, siltation structures, diversions and stockpiles. The requirements of subsection (8)(A) shall apply to these areas when they are no longer needed for support activities.

(C) The director may approve variances from the requirements of paragraphs (8)(A)1.—8. if—

1. The permittee can demonstrate that unusual circumstances which are beyond his/her control have made him/her temporarily unable to conform to the requirements;

2. The variance is requested for the purpose of improving the efficiency of the management of the reclaimed land, and the director determines that the variance will not unreasonably delay reclamation and the release of Phase III liability; or

3. The variance is requested for the purpose of allowing the permittee to perform reclamation that significantly exceeds the requirements of the law.

(D) The permittee shall report to the director the status of reclamation on all of his/her operations as of January 1 of each year. The report shall contain a narrative and map outlining the following as a minimum:

1. Total acres disturbed by mining (that is, spoil banks, open pit, bench);
2. Total acres disturbed to assist mining (that is, siltation structures, diversions, haul roads, topsoil stockpiles);
3. Acres finished graded (that is, all grading complete);
4. Acres not yet finished graded (that is, pit, bench, adjacent four (4) or fewer spoils);
5. Acres finished topsoiled (that is, topsoil completed and most likely seeded);
6. Acres not yet topsoiled;
7. Acres seeded (that is, permanent seeding of grass-legume and cover crop) and a description of the species planted and the methods used;
8. Acres permanent impoundments (that is, siltation structures and final pits);
9. Acres permanent roads;
10. Acres fully reclaimed (that is, reclamation completed; however, future touchup and overseeding may be necessary to ensure bond release status); and
11. Additional acres disturbed to support mining (that is, preparation plants, office and shop areas, slurry ponds, coal storage piles).

AUTHORITY: sections 444.530 and 444.810, RSMo Supp. 1999. Original rule filed Oct. 12, 1979, effective Feb. 11, 1980. Amended: Filed April 14, 1980, effective Aug. 11, 1980. Amended: Filed Dec. 10, 1980, effective April 11, 1981. Amended: Filed Dec. 9, 1982, effective April 11, 1983. Amended: Filed June 27, 1986, effective Oct. 27, 1986. Amended: Filed Aug. 14, 1986, effective Feb. 28, 1987. Amended: Filed Dec. 15, 1987, effective April 1, 1988. Amended: Filed Sept. 15, 1988, effective Jan. 15, 1989. Amended: Filed Jan. 4, 1989, effective April 1, 1989. Amended: Filed July 3, 1990, effective Nov. 30, 1990. Amended: Filed May 15, 1992, effective Jan. 15, 1993. Amended: Filed Sept. 29, 1995, effective March 30, 1996. Amended: Filed March 21, 2000, effective Oct. 30, 2000.*

**Original authority: 444.530, RSMo 1971, amended 1983, 1990, 1993, 1995 and 444.810, RSMo 1979, amended 1983, 1993, 1995.*

10 CSR 40-3.130 Postmining Land Use Requirements

PURPOSE: This rule sets forth postmining land use requirements pursuant to sections 444.810 and 444.855.2(2), RSMo.

(1) General. All affected areas shall be restored in a timely manner to—

(A) Conditions that are capable of supporting the uses which they were capable of supporting before any mining; or

(B) Higher or better uses achievable under criteria and procedures of this rule.

(2) Determining Premining Uses of Land. The pre-mining uses of land to which the postmining land use is compared shall be those uses which the land previously supported, if the land had not been previously mined and had been properly managed. The postmining land use for land that has been previously mined and not reclaimed shall be judged on the basis of the land use that existed prior to any mining; provided, that if the land cannot be reclaimed to the land use that existed prior to any mining because of the previously mined condition, the postmining land use shall be judged on the basis of the highest and best use that can be achieved which is compatible with surrounding areas and does not require the disturbance of areas previously unaffected by mining.

(A) The postmining land use for land that has been previously mined and not reclaimed shall be judged on the basis of the uses which it was capable of supporting prior to any mining, or the highest and best use that can be achieved and is compatible with surrounding areas and does not require the disturbance of areas previously unaffected by mining.

(B) The postmining land use for land that has received improper management shall be judged on the basis of the premining use of surrounding lands that have received proper management.

(C) If the premining use of the land was changed within five (5) years of the beginning of mining, the comparison of postmining use to premining use shall include a comparison with the historic use of the land as well as its use immediately preceding mining.

(3) Criteria for Alternative Postmining Land Uses. Higher or better uses may be approved by the regulatory authority as alternative postmining land uses after consultation with the landowner or the land management agency having jurisdiction over the lands, if the proposed uses meet the following criteria:

(A) There is a reasonable likelihood for achievement of the use;

(B) The use does not present any actual or probable hazard to public health or safety, or threat of water diminution or pollution;

- (C) The use will not—
1. Be impractical or unreasonable;
 2. Be inconsistent with applicable land use policies or plans;

3. Involve unreasonable delay in implementation; or

4. Cause or contribute to violation of federal, state or local law.

AUTHORITY: sections 444.530 and 444.810, RSMo 1994. Original rule filed Oct. 12, 1979, effective Feb. 11, 1980. Amended: Filed Dec. 10, 1980, effective April 11, 1981. Amended: Filed July 3, 1990, effective Nov. 30, 1990. Amended: Filed May 15, 1992, effective Jan. 15, 1993.*

**Original authority: 444.530, RSMo 1971 amended 1983, 1990, 1993, 1995; and 444.810, RSMo 1979, amended 1983, 1993, 1995;*

10 CSR 40-3.140 Road and Other Transportation Requirements

PURPOSE: This rule sets forth road and other transportation requirements pursuant to section 444.810, RSMo.

PUBLISHER'S NOTE: The publication of the full text of the material that the adopting agency has incorporated by reference in this rule would be unduly cumbersome or expensive. Therefore, the full text of that material will be made available to any interested person at both the Office of the Secretary of State and the office of the adopting agency, pursuant to section 536.031.4, RSMo. Such material will be provided at the cost established by state law.

(1) Roads—Class I—General.

(A) Each person who conducts surface mining activities shall locate, design, construct or reconstruct, utilize and maintain Class I roads and reclaim the area to meet the requirements of sections (2)–(7) of this rule and to control or prevent erosion; siltation; the air pollution attendant to erosion, including road dust as well as dust occurring on other exposed surfaces, by measures such as vegetating, watering, using chemical or other dust suppressants, or otherwise stabilizing all exposed surfaces in accordance with current, prudent engineering practices; and water pollution and damage to public or private property.

(B) To the extent possible using the best technology currently available, Class I roads shall not cause damage to fish, wildlife and related environmental values and shall not cause additional contributions of suspended solids to streamflow or to runoff outside the permit area. These contributions shall not be in excess of limitations of state or federal law.

(C) All Class I roads shall be removed and the land affected regraded and revegetated in

accordance with the requirements of section (7) of this rule unless—

1. Retention of the road is approved as part of the approved postmining land use or as being necessary to adequately control erosion;

2. The necessary maintenance is assured; and

3. All drainage is controlled according to section (4) of this rule.

(D) Class I Roads General Design.

1. The design and construction or reconstruction of Class I and II roads shall be certified by a qualified registered professional engineer in accordance with sections (2)–(7) of this rule. Construction or reconstruction of Class I roads must be certified in a report to the director. The report shall indicate that the Class I road has been constructed or reconstructed as designed and in accordance with the approved plan.

2. The design shall incorporate the demand for mobility and travel efficiency based on geometric criteria both horizontal and vertical, appropriate for the anticipated volume of traffic and weight and speed of vehicles to be used.

(2) Roads—Class I—Location.

(A) Class I roads shall be located, insofar as possible, on ridges or on the most stable available slopes to minimize erosion.

(B) No part of any Class I road shall be located in the channel of an intermittent or perennial stream unless specifically approved in the permit and plan.

(C) Stream fords are prohibited unless they are specifically approved in the permit and plan as temporary routes during periods of construction. The fords shall not adversely affect stream sedimentation or fish, wildlife and related environmental values. All other stream crossings shall be made using bridges, culverts or other structures designed, constructed and maintained to meet the requirements of section (4) of this rule.

(D) Class I roads shall be located to minimize downstream sedimentation and flooding.

(3) Roads—Class I—Design and Construction. Class I roads shall be designed and constructed or reconstructed in compliance with the following standards in order to control subsequent erosion and disturbance of the hydrological balance:

(A) Vertical Alinement. Except where lesser grades are necessary to control site-specific conditions, maximum road grades shall be as follows:

1. The overall grade shall not exceed 1v:10h (10%);

2. The maximum pitch grade shall not exceed 1v:6.5h (15%); and

3. There shall be not more than three hundred feet (300') of pitch grade exceeding ten percent (10%) within any consecutive one thousand feet (1000') of Class I roads, but in no case shall there be any pitch grade over fifteen percent (15%);

(B) Horizontal Alinement. Class I roads shall have horizontal alinement as consistent with the existing topography as possible and shall provide the alinement required to meet the performance standards of sections (1)–(7) of this rule. The alinement shall be determined in accordance with the anticipated volume of traffic, and weight and speed of vehicles to be used. Horizontal and vertical alinement shall be coordinated to ensure that one will not adversely affect the other and to ensure that the road will not cause environmental damage;

(C) Road Cuts.

1. Cut slopes shall not be steeper than specifically authorized in the permit and plan which shall not authorize slopes steeper than 1v:1.5h in unconsolidated materials or 1v:0.25h in rock, except that steeper slopes may be specifically authorized in the permit and plan if geotechnical analysis demonstrates that a minimum safety factor of one and five-tenths (1.5) can be maintained.

2. Topsoil or other materials suitable under 10 CSR 40-3.030(2) shall be placed on all cut slopes of 1v:1.5h or flatter to aid in establishing vegetation and to minimize erosion. Topsoil depth shall be adequate to support vegetation necessary to control erosion.

3. Temporary erosion-control measures shall be implemented during construction to minimize sedimentation and erosion until permanent control measures can be established;

(D) Road Embankments. Embankment sections shall be constructed in accordance with the following provisions:

1. All vegetative material and topsoil shall be removed from the embankment foundation during construction to increase stability and no vegetative material or topsoil shall be placed beneath or in any Class I road embankment;

2. Where an embankment is to be placed on side slopes exceeding 1v:5h (20%), the existing ground shall be plowed, stepped or; if in bedrock, keyed in a manner which increases the stability of the fill. The keyway shall be a minimum of ten feet (10') in width and shall extend a minimum of two feet (2') below the toe of the fill;

3. Material containing by volume less than twenty-five percent (25%) of rock larger than six inches (6") in greatest dimension

shall be spread in successive uniform layers not exceeding twelve inches (12") in thickness before compaction;

4. Where the material for an embankment consists of large size rock, broken stone or fragmented material that makes placing it in twelve-inch (12") layers impossible under paragraph (3)(D)3. of this rule, the embankment shall be constructed in uniform layers not exceeding in thickness the approximate average size of the rock used, but the layers shall not exceed thirty-six inches (36") in thickness. Rocks shall not be dumped in final position but shall be distributed by blading or dozing in a manner that will ensure proper placement in the embankment, so that voids, pockets and bridging will be reduced to a minimum. The final layer of the embankment shall meet the requirements of paragraph (3)(D)3. of this rule;

5. Each layer of the embankment shall be completed, leveled and compacted before the succeeding layer is placed. Loads of material shall be leveled as placed and kept smooth. The successive layers shall be evenly compacted by routing the hauling and leveling equipment over the entire width of the embankment. This procedure shall be continued until no visible horizontal movement of the embankment material is apparent;

6. Embankment layers shall be compacted as necessary to ensure that the embankment is adequate to support the anticipated volume of traffic and weight and speed of vehicles to be used. In selecting the method to be used for placing embankment material, consideration shall be given in the design to factors such as the foundation, geological structure, soils, type of construction and equipment to be used. A structural and foundational analysis shall be performed to establish design standards for embankment stability appropriate to the site. Publications of the American Association of State Highway and Transportation Officers (AASHTO) including AASHTO T-99, T-180, T-191 and the modified AASHTO test or other specifications generally recognized by transportation engineers as adequate for design of highway embankments, shall be used to determine the degree of compaction required, on the basis of soil type and the anticipated volume of traffic and weight and speed of vehicles to be used and are incorporated in this rule by reference. Compaction effort shall be adequate to achieve the degree of compaction required. No lift shall be placed on a layer until the design density is achieved throughout the layer. AASHTO specifications such as T-99, T-180, the modified AASHTO test or other comparable specifications approved in the permit and plan shall be used as guidelines

for the determination of the maximum dry density for granular materials;

7. Material shall be placed in an embankment only when its moisture content is within acceptable levels to achieve design compaction;

8. Embankment slopes shall not be steeper than 1v:2h, except that where the embankment material is a minimum of eighty-five percent (85%) rock, slopes shall not be steeper than 1v:1.35h if it has been demonstrated that embankment stability will result. Where rock embankments are constructed, they shall meet the requirements of paragraph (3)(D)4. of this rule;

9. The minimum safety factor for all embankments shall be one and three-tenths (1.3) or a higher factor as the permit and plan may specify;

10. The road surface shall be sloped toward the ditch line at a minimum rate of one-quarter inch (1/4") per foot of surface width or crowned at a minimum rate of width as measured from the centerline of the road;

11. All material used in embankments shall be suitable for use under paragraphs (3)(D)1.–8. of this rule. The material shall be reasonably free of organic material, coal or coal blossom, frozen materials, wet or peat material, natural soils containing organic matter or any other material considered unsuitable in the permit and plan for use in embankment construction;

12. Excess or unsuitable material from excavations, as defined in paragraph (3)(D)11. of this rule, shall be disposed of in accordance with 10 CSR 40-3.060(1). Acid- and toxic-forming material shall be disposed of in accordance with 10 CSR 40-3.040(8), 10 CSR 40-3.080(1) and 10 CSR 40-3.110(3);

13. Acid-producing materials shall be permitted for constructing embankments for only those Class I roads constructed or reconstructed on coal processing waste banks and only if it has been demonstrated that no additional acid will leave the confines of the coal processing waste bank. In no case shall acid-bearing refuse material be used outside the confines of the coal processing waste bank. Restoration of the road shall be in accordance with the requirements of 10 CSR 40-3.110(3)–(6) and 10 CSR 40-3.120(1)–(7);

14. Topsoil or other material suitable under 10 CSR 40-3.030(2) shall be placed on all embankment slopes of 1v:1.5h or flatter to aid in establishing vegetation and to minimize erosion. Topsoil material depth shall be adequate to support vegetation and to prevent erosion; and

15. Temporary erosion-control measures shall be incorporated during construction to

control sedimentation and minimize erosion until permanent control measures can be established; and

(E) Topsoil Removal. Before initiation of construction or reconstruction of a Class I road, topsoil and other materials, as determined under 10 CSR 40-3.030(2), shall be removed from the design roadbed, shoulders and surfaces where associated structures will be placed and shall be stored in accordance with 10 CSR 40-3.030(3).

(4) Roads—Class I—Drainage.

(A) General.

1. Each Class I road shall be designed, constructed or reconstructed and maintained to have adequate drainage, using structures such as, but not limited to, ditches, cross drains and ditch relief drains. The water control system shall be designed to safely pass the peak runoff from a ten (10)-year, (24)-hour precipitation event or a greater event if required in the permit and plan.

2. Sediment control shall comply with 10 CSR 40-3.040(2) and (5).

3. Vegetation shall not be cleared for more than the width necessary for road and associated ditch construction, to serve traffic needs and for utilities.

(B) Ditches.

1. A ditch shall be provided on both sides of a through-cut and on the inside shoulder of a cut-and-fill section, with ditch relief cross drains spaced according to grade. Water shall be intercepted before reaching a switchback or large fill and drained safely away in accordance with this section. Water from a fill or switchback shall be released below the fill, through conduits or in riprapped channels and shall not be discharged onto the fill. Drainage ditches shall be placed on the toe of all cut slopes formed by the construction of roads.

2. On the flat sections of Class I roads where rolling topography is insufficient to provide natural ditch drainage, the road grade shall be undulated to provide for free flow of water in the ditch section. Road sections may be constructed to elevate the road surface above the original ground surface to facilitate drainage.

(C) Culverts and Bridges.

1. Culvert design.

A. Culverts with an end area of thirty-five (35) square feet or less shall be designed to safely pass the ten (10)-year, twenty-four (24)-hour precipitation event without a head of water at the entrance. Culverts with an end area greater than thirty-five (35) square feet and bridges with spans of thirty feet (30') or less, shall be designed to safely pass the twenty (20)-year, twenty-

four (24)-hour precipitation event. Bridges with spans of more than thirty feet (30') shall be designed to safely pass the one hundred (100)-year, twenty-four (24)-hour precipitation event or a larger event as specified by the permit and plan.

B. Drainage pipes and culverts shall be constructed to avoid plugging or collapse and erosion at inlets and outlets.

C. Trash racks and debris basins shall be installed in the drainage ditches wherever debris from the drainage ditches could impair the functions of drainage and sediment-control structures.

D. All culverts shall be covered by compacted fill to a minimum depth of one foot (1').

E. Culverts shall be designed, constructed and maintained to sustain the vertical soil pressure the passive resistance of the foundation and the weight of vehicles to be used.

2. Culverts for road-surface drainage only shall be constructed in accordance with the following:

A. Unless otherwise authorized or required under subparagraph (4)(C)2.B. or C. of this rule, culverts shall be spaced as follows. Spacing shall not exceed:

(I) One thousand feet (1000') on grades of zero percent to three percent (0%–3%);

(II) Eight hundred feet (800') on grades of three percent to six percent (3%–6%);

(III) Five hundred feet (500') on grades of six percent to ten percent (6%–10%); and

(IV) Three hundred feet (300') on grades of ten percent (10%) or greater;

B. Culverts at closer intervals than the maximum in subparagraph (4)(C)2.A. of this rule shall be installed if required in the permit and plan as appropriate for the erosive properties of the soil or to accommodate flow from small intersecting drainages;

C. Culverts may be constructed at greater intervals than the maximum indicated in subparagraph (4)(C)2.A. of this rule if authorized in the permit and plan upon a finding that greater spacing will not increase erosion;

D. Culverts shall cross the road at not less than a thirty degree (30°) angle down-grade;

E. Culverts may be designed to carry less than the peak runoff from a ten (10)-year, twenty-four (24)-hour precipitation event if the ditch will not overtop and will remain stable; and

F. The inlet end shall be protected by a rock headwall or other material approved in

the permit and plan as adequate protection against erosion of the headwall. The water shall be discharged below the toe of the fill through conduits or in ripped channels and shall not be discharged onto the fill.

(D) Natural Drainage. Natural channel drainageways shall not be altered or relocated for road construction or reconstruction without prior approval in the permit and plan in accordance with 10 CSR 40-3.040(3) and (4). Alterations and relocations may be approved in the permit and plan only if—

1. The natural channel drainage is not blocked;
2. No significant damage occurs to the hydrologic balance; and
3. There is no adverse impact on adjoining landowners.

(E) Stream Crossings. Drainage structures are required for stream channel crossing. Drainage structures shall not affect the normal flow or gradient of the stream, or adversely affect fish migration and aquatic habitat or related environmental values.

(5) Roads—Class I—Surfacing.

(A) Class I roads shall be surfaced with rock, crushed gravel, asphalt or other material approved in the permit and plan as sufficiently durable for the anticipated volume of traffic, and weight and speed of vehicles to be used.

(B) Acid- or toxic-forming substances shall not be used in road surfacing.

(6) Roads—Class I—Maintenance.

(A) Class I roads shall be maintained in a manner that the required or approved design standards are met throughout the life of the entire transportation facility including surface, shoulders, parking and side areas, approach structures, erosion control devices, cut-and-fill sections and traffic-control devices as are necessary for safe and efficient utilization of the road.

(B) Class I road maintenance shall include repairs to the road surface, blading, filling of potholes and replacement of gravel or asphalt. It shall include revegetating, brush removal, watering for dust control and minor reconstruction of road segments as necessary.

(C) Class I roads damaged by catastrophic events, such as floods or earthquakes, shall not be used until reconstruction of damaged road elements. The reconstruction shall be completed as soon as practicable after the damage has occurred.

(D) A road shall be maintained to meet the performance standards applicable in this rule and any additional criteria specified by the regulatory authority.

(7) Roads—Class I—Restoration.

(A) Unless the retention of a Class I road is approved in the permit and plan, as suitable for the approved postmining land use, immediately after the road is no longer needed for operations, reclamation or monitoring—

1. The road shall be closed to vehicular traffic;
2. The natural drainage patterns shall be restored;
3. All bridges and culverts shall be removed;
4. Roadbeds shall be ripped, plowed and scarified;
5. Fill slopes shall be rounded or reduced and shaped to conform the site to adjacent terrain and to meet natural drainage restoration standards;
6. Cut slopes shall be shaped to blend with the natural contour;
7. Cross drains, dikes and water bars shall be constructed to minimize erosion;
8. Terraces shall be constructed as necessary to prevent excessive erosion and to provide long-term stability in cut-and-fill slopes; and
9. Road surfaces shall be covered with topsoil in accordance with 10 CSR 40-3.030(4)(B) and revegetated in accordance with 10 CSR 40-3.120(1)–(6).

(B) Unless otherwise authorized in the permit and plan, all road surfacing materials shall be removed, hauled or conveyed and disposed of under 10 CSR 40-3.080(8).

(8) Roads—Class II—General.

(A) Each person who conducts surface mining activities shall locate, design, construct or reconstruct, utilize and maintain Class II roads and reclaim the area to meet the requirements of sections (9)–(14) of this rule and to control or prevent erosion; siltation; the air pollution attendant to erosion, including road dust as well as dust occurring on other exposed surfaces, by measures such as vegetating, watering, using chemical or other dust suppressants, or otherwise stabilizing all exposed surfaces in accordance with current, prudent engineering practices; and water pollution and damage to public or private property.

(B) To the extent possible using the best technology currently available, Class II roads shall not cause damage to fish, wildlife and related environmental values and shall not cause additional contributions to suspended solids to streamflow or to runoff outside the permit area. These contributions shall not be in excess of limitations of state or federal law.

(C) All Class II roads shall be removed and the affected land regraded and revegetated in

accordance with the requirements of section (14) of this rule, unless—

1. Retention of the road is approved as part of the approved postmining land use or as being necessary to control erosion adequately;
2. The necessary maintenance is assured; and
3. All drainage is controlled according to section (11) of this rule.

(D) Class II Roads General Design.

1. The design and construction or reconstruction of Class II roads shall be certified by a registered professional engineer in accordance with sections (9)–(12) of this rule. Construction or reconstruction of Class II roads must be certified in a report to the director. The report shall indicate that the Class II road has been constructed or reconstructed as designed and in accordance with the approved plan.

2. The design shall incorporate consideration of the needs of the specific uses of the road in addition to travel efficiency. To the extent that the anticipated volume of traffic or weight or speed of vehicles to be used requires higher standards than those set forth in sections (9)–(14) of this rule, those higher standards shall be incorporated in the design, construction or reconstruction and maintenance of Class II roads.

(9) Roads—Class II—Location.

(A) Class II roads shall be located, as far as possible, on ridges or on the most stable available slopes to minimize erosion.

(B) No part of any Class II road shall be located in the channel of an intermittent or perennial stream unless specifically approved in the permit and plan.

(C) Stream fords are prohibited unless they are specifically approved in the permit and plan as temporary routes during periods of construction. The fords shall not adversely affect stream sedimentation or fish, wildlife and related environmental values. All other stream crossings shall be made using bridges, culverts or other structures, designed, constructed and maintained to meet the requirements of section (11) of this rule.

(D) Class II roads shall be located to minimize downstream sedimentation and flooding.

(10) Roads—Class II—Design and Construction. Class II roads shall be designed and constructed or reconstructed in compliance with the following standards in order to control subsequent erosion and disturbance of the hydrologic balance:

(A) Vertical Alinement. A continuous grade with excessive cuts or embankments

shall be avoided. Changes of grade shall be made to conform as closely as possible to the existing terrain and maximum road grades shall be as follows:

1. The overall grade shall not exceed 1v:10h (10%);
2. The pitch grade shall not exceed 1v:6.5h (15%), for any consecutive one thousand feet (1000'); and
3. The pitch grade exceeding fifteen percent (15%) shall not be longer than three hundred feet (300') within any consecutive one thousand feet (1000') of Class II roads;

(B) Horizontal Alinement. Class II roads shall have horizontal alinement as consistent with the existing natural topography as possible and shall provide the alinement required for the performance standards of sections (8)–(14) of this rule. The alinement shall be determined in accordance with the anticipated volume of traffic and weight and speed of vehicles to be used. Horizontal and vertical alinement shall be coordinated to ensure that one will not adversely affect the other and to ensure that the road will not cause environmental damage;

(C) Road Cuts. Cut slopes shall not be steeper than specifically authorized in the permit and plan, which shall not authorize slopes steeper than 1v:1.5h in unconsolidated materials or 1v:0.25h in rock, except that steeper slopes may be specifically authorized in the permit and plan if geotechnical analysis demonstrates that a minimum safety factor of one and five-tenths (1.5) can be maintained.

1. Topsoil or other materials suitable under 10 CSR 40-3.030(2) shall be placed on all cut slopes of 1v:1.5h or flatter to aid in establishing vegetation and to minimize erosion. Topsoil depth shall be adequate to support vegetation necessary to minimize erosion.

2. Temporary erosion control measures shall be implemented during construction to minimize sedimentation and erosion until permanent control measures can be established;

(D) Road Embankments. Embankment sections shall be constructed in accordance with the following provisions:

1. All vegetative material and topsoil shall be removed from the embankment foundation to increase stability and no vegetative material or topsoil shall be placed beneath or in any Class II road embankment;

2. Where any embankment is to be placed on side slopes exceeding 1v:3h (33%), the existing ground shall be plowed, stepped or if in rock, keyed in a manner which increases the stability of the fill. The keyways shall be a minimum of ten feet (10') in width

and shall begin at the toe of the fill. No material shall be placed below the toe or be allowed to slide below the toe. For slopes of less than 1v:3h (33%), the slopes shall be scarified to ensure bonding of the embankment and natural material;

3. Material containing by volume less than twenty-five percent (25%) of rock larger than six inches (6") in greatest dimension shall be spread in successive uniform layers not exceeding twelve inches (12") in thickness before compaction;

4. Where the material for an embankment consists of large size rock, broken stone or fragmented material that makes placing in twelve-inch (12") layers impossible under paragraph (10)(D)3. of this rule, the embankment shall be constructed in uniform layers not exceeding in thickness the approximate average size of the rock used but, the layers shall not exceed thirty-six inches (36") in thickness. Rock shall not be dumped in final position, but shall be distributed by blading or dozing in a manner that will ensure proper placement in the embankment, so that voids, pockets and bridging will be reduced to a minimum. The final layer of the embankment shall meet the requirements of paragraph (10)(D)3. of this rule;

5. Each layer of the embankment shall be completed, leveled and compacted before the succeeding layer is placed. Embankment material shall be leveled as placed and kept smooth. The successive layers shall be compacted evenly by routing the hauling and leveling equipment over the entire width of the embankment. This procedure shall be continued until no visible horizontal movement of the embankment material is apparent;

6. Compaction greater than that specified in paragraph (10)(D)5. of this rule shall be performed to the extent necessary to ensure stability;

7. Material shall be placed in an embankment under moisture content conditions which will permit compaction and ensure proper soil cohesion;

8. Embankment slopes shall not be steeper than 1v:1.5h, except that if the embankment material is a minimum of eighty-five percent (85%) rock, slopes shall not be steeper than 1v:1.35h if it has been demonstrated that embankment stability will result. Where rock embankments are constructed, they shall meet the requirements of paragraph (10)(D)4. of this rule;

9. The minimum safety factor for all embankments shall be one and three-tenths (1.3) or a higher factor as may be specified in the permit or plan;

10. The road surface shall be sloped sufficiently to prevent ponding of water on the surface;

11. All material used in embankments shall be suitable for use under paragraphs (10)(D)1.–8. of this rule. The material shall be reasonably free of organic material, coal or coal blossom, frozen materials, wet or peat material or natural soils containing organic matter or any other material considered unsuitable for use in embankment construction in the permit and plan;

12. Excess or unsuitable material from excavations, as defined in paragraph (10)(D)11. of this rule, shall be disposed of in accordance with 10 CSR 40-3.040(8), 10 CSR 40-3.060(1), 10 CSR 40-3.080(1) and 10 CSR 40-3.110(3);

13. Topsoil or other material suitable under 10 CSR 40-3.030(2) shall be placed on all embankment slopes of 1v:1.5h or flatter to aid in establishing vegetation to minimize erosion. Topsoil material depth shall be adequate to support vegetation and to minimize erosion; and

14. Temporary erosion control measures shall be incorporated during construction to control sedimentation and minimize erosion until permanent control measures can be established; and

(E) Topsoil Removal. Before initiation of construction or reconstruction of a Class II road, topsoil and other materials, as determined under 10 CSR 40-3.030(2), shall be removed from the design roadbed, shoulders and surfaces where associated structures will be placed and shall be stored in accordance with 10 CSR 40-3.030(3).

(11) Roads—Class II—Drainage.

(A) General.

1. Each Class II road shall be designed, constructed or reconstructed and maintained to have adequate drainage, using structures such as ditches in wet areas, cross drains in natural drainageways, surface dips and stream crossings. The water control system shall be designed to safely pass the peak runoff from a ten (10)-year, twenty-four (24)-hour precipitation event or a greater event if required in the permit and plan.

2. Sediment control shall comply with 10 CSR 40-3.040(2) and (5).

(B) Ditches and Alternative Measures for Roadbed Erosion Control. Where required to minimize erosion on the roadbed, ditches shall be designed and constructed in accordance with subsection (4)(B) of this rule. In wet areas or where there is free water, these ditch sections shall be required. For every segment of a Class II road without drainage ditches which comply with subsection (4)(B)

of this rule, drainage shall be provided by surface dips. These drainage dips shall be constructed as undulations in the roadway of sufficient height from the hydraulic bottom to the top of the dip to prevent water from running down the surface of the road. Insloped dips shall discharge into a culvert or drop inlet. Outsloped dips shall discharge either onto the natural ground or onto embankments if a drain is provided. The bottom of the dip shall be rock surfaced to prevent erosion. Dip spacing shall be sufficient to minimize erosion of the road surface.

(C) Culverts and Bridges.

1. Culvert design.

A. Culverts with an end area of thirty-five (35) square feet or less shall be designed to safely pass the ten (10)-year, twenty-four (24)-hour precipitation event without a head of water at the entrance. Culverts with an end area of greater than thirty-five (35) square feet and bridges with spans of thirty feet (30') or less, shall be designed to safely pass the twenty (20)-year, twenty-four (24)-hour precipitation event. Bridges with spans of more than thirty feet (30') shall be designed to safely pass the one hundred (100)-year, twenty-four (24)-hour precipitation event or larger event as specified in the permit and plan.

B. Drainage pipes and culverts shall be constructed to avoid plugging or collapse and erosion at inlets and outlets.

C. Culverts shall be covered by compacted fill to minimum depth of one foot (1').

D. Culverts shall be designed, constructed and maintained to sustain the vertical soil pressure, the passive resistance of the road foundation and the weight of vehicles to be used.

2. Culverts or dips for road-surface drainage only shall be constructed in accordance with the following:

A. Unless otherwise authorized or required under subparagraph (11)(C)2.B. or C. of this rule, culverts and dips shall be spaced as follows. Spacing shall not exceed:

(I) One thousand feet (1000') on grades of zero percent to three percent (0%–3%);

(II) Six hundred feet (600') on grades of three percent to six percent (3%–6%);

(III) Four hundred feet (400') on grades of six percent to ten percent (6%–10%); and

(IV) Two hundred feet (200') on grades of ten percent (10%) or greater;

B. Surface dips or culverts at closer intervals than the maximum indicated in subparagraph (11)(C)2.A. of this rule shall be installed if required in the permit and plan as

appropriate for the erosive properties of the soil or to accommodate flow from small intersecting drainages;

C. Surface dips or culverts may be constructed at greater intervals than the maximum indicated in subparagraph (11)(C)2.A. of this rule if authorized in the permit and plan upon a finding that greater spacing will not increase erosion;

D. Culverts and the bottoms of drainage dips shall cross the road at not less than a thirty degree (30°) angle downgrade;

E. A culvert may be designed to carry less than the peak runoff from a ten (10)-year, twenty-four (24)-hour precipitation event if the ditch will not overtop and will remain stable; and

F. The inlet end of all culverts shall be protected by a rock headwall or other material approved in the permit and plan as adequate protection against erosion of the headwall. The water shall be discharged below the toe of the fill through conduits or in rippapped channels and shall not be discharged onto the fill.

(D) Natural Drainage. Natural channel drainageways shall not be altered or relocated for road construction or reconstruction without the prior approval in the permit and plan in accordance with 10 CSR 40-3.040(3) and (4). The permit and plan may approve alterations and relocations only if—

1. The natural channel drainage is not blocked;

2. No significant degradation occurs to the hydrologic balance; and

3. There is no adverse impact on adjoining landowners.

(E) Stream Crossings. Drainage structures are required for stream channel crossings. Drainage structures shall not affect the normal flow or gradient of the stream, or adversely affect fish migration or aquatic habitat or related environmental values.

(12) Roads—Class II—Surfacing.

(A) Class II roads shall be surfaced with rock, crushed gravel, asphalt or other material approved in the permit and plan as sufficiently durable for the anticipated volume of traffic and weight and speed of vehicles to be used.

(B) Acid- or toxic-forming substances shall not be used in road surfacing.

(C) Vegetation shall not be cleared for more than the width necessary for road and associated ditch construction, to serve traffic needs and for utilities.

(13) Roads—Class II—Maintenance.

(A) Class II roads shall be maintained in such a manner that the required or approved

design criteria are met throughout the life of the facility including surface and shoulders, parking, side areas, approach structures, erosion-control devices and these traffic control devices as are necessary for safe and efficient utilization.

(B) Class II road maintenance shall include basic custodial care as required to protect the road investment and to prevent damage to adjacent resources. This includes maintenance to control erosion, repair of structures and drainage systems, removal of rocks and debris, replacement of surface and restoration of the road prism.

(C) A road damaged by a catastrophic event, such as a flood or earthquake, shall be repaired as soon as is practicable after the damage has occurred.

(D) A road shall be maintained to meet the performance standards applicable in this rule and any additional criteria specified by the regulatory authority.

(14) Roads—Class II—Restoration.

(A) Unless the retention of a Class II road is approved in the permit and plan, as suitable for the approved postmining land use, immediately after the road is no longer needed for operations, reclamation or monitoring—

1. The road shall be closed to vehicular traffic;

2. The natural drainage patterns shall be restored;

3. All bridges and culverts shall be removed;

4. Roadbeds shall be ripped, plowed and scarified;

5. Fill slopes shall be rounded or reduced and shaped to conform the site to adjacent terrain and to meet natural drainage restoration standards;

6. Cut slopes shall be reshaped to blend with the natural contour;

7. Cross drains, dikes and water bars shall be constructed to minimize erosion;

8. Terraces shall be constructed as necessary to prevent excessive erosion and to provide long-term stability in cut-and-fill slopes; and

9. Road surfaces shall be covered with topsoil in accordance with 10 CSR 40-3.030(4)(B) and revegetated in accordance with 10 CSR 40-3.120(1)–(6).

(B) Unless otherwise authorized in the permit and plan, all road surfacing materials shall be removed, hauled or conveyed and disposed of under 10 CSR 40-3.080(8).

(15) Roads—Class III—General.

(A) Each person who conducts surface mining activities shall locate, design, construct or reconstruct, utilize and maintain

Class III roads and reclaim the area to meet the requirements of sections (16)–(21) of this rule and to control or prevent erosion; siltation; the air pollution attendant to erosion, including road dust as well as dust occurring on other exposed surfaces, by measures such as vegetating, watering, using chemical or other dust suppressants, or otherwise stabilizing all exposed surfaces in accordance with current, prudent engineering practices; and water pollution and damage to public or private property.

(B) To the extent possible using the best technology currently available, Class III roads shall not cause damage to fish, wildlife and related environmental values and shall not cause additional contributions of suspended solids to streamflow or to runoff outside the permit area. These contributions shall not be in excess of limitations of state or federal law.

(C) All Class III roads shall be completely removed and the land affected regraded to the approximate original contour and revegetated in accordance with the requirements of section (21) of this rule except where subsection (16)(G) of this rule shall apply.

(D) To the extent that the anticipated volume or weight or speed of vehicles to be used requires higher standards than those set forth in sections (16)–(21) of this rule, these higher standards shall be incorporated in the design, construction and reconstruction or maintenance of Class III roads.

(16) Roads—Class III—Location.

(A) Class III roads shall be located on ridges or on the most stable available slopes to minimize erosion.

(B) No part of any Class III road shall be located in the channel of an intermittent or perennial stream unless specifically approved in the permit and plan.

(C) Stream fords are prohibited unless they are approved in the permit and plan as temporary routes across ephemeral or intermittent streams that will not adversely affect stream sedimentation or fish, wildlife and related environmental values. All other stream crossings shall be made using temporary bridges, culverts or other structures designed, constructed and maintained to meet the requirements of section (18) of this rule.

(D) Class III roads shall be located to minimize downstream sedimentation and flooding.

(E) Not later than the date a permit application is submitted to the director for surface mining activities for which a Class III road is proposed, the location of the proposed road shall be clearly marked in the field by flags

or stakes to enable the director to perform on-site review.

(F) Class III roads shall not be located in wet, steep or unstable areas where complete restoration under section (21) of this rule cannot be accomplished.

(G) A Class III road may be constructed in the same alignment as a Class I or Class II road that is to be constructed on the same location at a later date. This may be permitted if the requirements for the location of the Class I or Class II road are met and the construction begins within six (6) months from the time the Class III road is constructed.

(17) Roads—Class III—Design and Construction. Field design methods shall be utilized for Class III roads.

(A) Vertical Alinement. Except where lesser grades are necessary to control site-specific conditions, maximum road grades shall be as follows:

1. The overall grade shall not exceed 1v:10h (10%);

2. The pitch grade shall not exceed 1v:5h (20%); and

3. There shall not be more than one thousand (1000) consecutive feet of maximum pitch grade.

(B) Horizontal Alinement. Class III roads may meander so as to avoid large growths of vegetation and other natural obstructions.

(C) Road Cuts. Sidecast construction may be used.

(D) Road Embankments. Compaction on embankments shall be required only to the extent necessary to control erosion and maintain the road.

(E) Topsoil Removal. Topsoil shall be removed and stockpiled only where excavation would require replacement of material and redistribution of topsoil for proper revegetation.

(18) Roads—Class III—Drainage.

(A) General.

1. Class III road drainage shall consist of temporary culverts in flowing streams, wet areas and in ephemeral channels as necessary to protect the facility during its life and to minimize disturbance of the hydrologic balance.

2. Sediment control shall comply with 10 CSR 40-3.040(2) and (5).

(B) Culverts and Bridges. Temporary culverts shall be installed for all flowing drainages and stream crossings. Temporary culverts and bridges shall be sized to safely pass the one (1)-year, six (6)-hour precipitation event.

(C) Natural Drainage. Natural channel drainageways shall not be altered or relocated

for the purposes of Class III road construction.

(D) Stream Crossing. Temporary drainage structures are required for crossing permanent streams. Drainage structures shall not affect the normal flow or gradient of the stream, adversely affect fish migration and aquatic habitat or related environmental values.

(19) Roads—Class III—Surface.

(A) Class III road surfaces shall be adequate for the use of the road.

(B) Acid- or toxic-forming substances shall not be used in road surfacing.

(C) Vegetation shall not be cleared for more than the width necessary to serve traffic needs and for utilities.

(20) Roads—Class III—Maintenance.

(A) Class III roads shall be sufficient to ensure minimization of erosion for the life of the road.

(B) Class III roads shall not be used if climatic conditions are such that usage may cause degradation of water quality.

(C) A road damaged by a catastrophic event, such as a flood or earthquake, shall be repaired as soon as is practicable after the damage has occurred.

(D) A road shall be maintained to meet the performance standards applicable in this rule and any additional criteria specified by the regulatory authority.

(21) Roads—Class III—Restoration. Immediately after a Class III road is no longer needed for operations, reclamation or monitoring—

(A) The road shall be closed to vehicular traffic;

(B) The natural drainage patterns shall be restored;

(C) All bridges and culverts shall be removed;

(D) Roadbeds shall be ripped, plowed and scarified;

(E) Fill slopes shall be rounded or reduced and shaped to conform the site to adjacent terrain and meet natural drainage restoration standards;

(F) Cut slopes shall be reshaped to blend with the natural contour;

(G) Cross drains, dikes and water bars shall be constructed to control erosion; and

(H) Road surfaces from which topsoil has been removed shall be covered with topsoil in accordance with 10 CSR 40-3.030(4)–(8) and the surface shall be vegetated in accordance with 10 CSR 40-3.120(1)–(6).

(22) Other Transportation Facilities. Railroad loops, spurs, sidings, surface conveyor sys-

tems, chutes, aerial tramways or other transportation facilities shall be designed, constructed or reconstructed and maintained and the area restored, to—

(A) Prevent, to the extent possible using the best technology currently available—

1. Damage to fish, wildlife and related environmental values; and

2. Additional contributions of suspended solids to streamflow or runoff outside the permit area. These contributions shall not be in excess of limitations of state or federal law;

(B) Control and minimize diminution or degradation of water quality and quantity;

(C) Control and minimize erosion and siltation;

(D) Control and minimize air pollution; and

(E) Prevent damage to public or private property.

(23) Support Facilities and Utility Installations.

(A) Support facilities required for or used incidentally to, the operation of the mine, including, but not limited to, mine buildings, coal loading facilities at or near the mine site, coal storage facilities, equipment storage facilities, fan buildings, hoist buildings, preparation plants, sheds, shops and other buildings shall be designed, constructed or reconstructed and located to prevent or control erosion and siltation, water pollution and damage to public or private property. Support facilities shall be designed, constructed or reconstructed, maintained and used in a manner which prevents to the extent possible using the best technology currently available—

1. Damage to fish, wildlife and related environmental values; and

2. Additional contributions of suspended solids to streamflow or runoff outside the permit area. These contributions shall not be in excess of limitations of state or federal law.

(B) All surface mining activities shall be conducted in a manner which minimizes damages, destruction or disruption of services provided by oil, gas and water wells; oil, gas and coal-slurry pipelines; railroads; electric and telephone lines; and water and sewage lines which pass over, under or through the permit area, unless otherwise approved by the owner of those facilities and in the permit and plan.

AUTHORITY: sections 444.530 and 444.810 RSMo Supp. 1999. Original rule filed Oct. 12, 1979, effective Feb. 11, 1980. Amended: Filed July 3, 1990, effective Nov. 30, 1990. Amended: Filed May 15, 1992, effective Jan. 15, 1993. Amended: Filed Sept. 15, 1994,*

effective April 30, 1995. Amended: Filed March 21, 2000, effective Oct. 30, 2000.

**Original authority: 444.530, RSMo 1971, amended 1983, 1990, 1993, 1995; 444.810, RSMo 1979, amended 1983, 1993, 1995.*

10 CSR 40-3.150 Requirements for Coal Recovery, Land Reclamation and Cessation of Operations

PURPOSE: This rule sets forth requirements for coal recovery, contemporaneous land reclamation and temporary and permanent cessation of surface mining activities pursuant to section 444.810, RSMo.

(1) Coal Recovery. Surface mining activities shall be conducted so as to maximize the utilization and conservation of the coal, while utilizing the best appropriate technology currently available to maintain environmental integrity, so that re-affecting the land in the future through surface coal mining operations is minimized.

(2) Contemporaneous Reclamation. Reclamation efforts, including, but not limited to, backfilling, grading, topsoil replacement and revegetation, of all land that is disturbed by surface mining activities shall occur as contemporaneously as practicable with mining operations.

(3) Cessation of Operations—Temporary.

(A) Each person who conducts surface mining activities shall effectively secure surface facilities in areas in which there are no current operations, but in which operations are to be resumed under an approved permit. Temporary abandonment shall not relieve a person of his/her obligation to comply with any provisions of the approved permit.

(B) Before temporary cessation of mining and reclamation operations for a period of thirty (30) days or more, or as soon as it is known that a temporary cessation will extend beyond thirty (30) days, persons who conduct surface mining activities shall submit to the director a notice of intention to cease or abandon mining and reclamation operations. This notice shall include a statement of the exact number of acres which will have been affected in the permit area, prior to temporary cessation, the extent and kind of reclamation of those areas which will have been accomplished and identification of the backfilling, regrading, revegetation, environmental monitoring and water treatment activities that will continue during the temporary cessation.

(4) Cessation of Operations—Permanent.

(A) Persons who cease surface mining activities permanently shall close or backfill or otherwise permanently reclaim all affected areas, in accordance with this chapter and the approved permit and plan.

(B) All underground openings, equipment, structures or other facilities not required for monitoring, unless approved in the permit and plan as suitable for the postmining land use or environmental monitoring, shall be removed and the affected land reclaimed.

AUTHORITY: section 444.530, RSMo 1994. Original rule filed Oct. 12, 1979, effective Feb. 11, 1980.*

**Original authority 1979, amended 1983, 1990, 1993.*

10 CSR 40-3.160 Training, Examination and Certification of Blasters

PURPOSE: This rule brings the Land Reclamation Program into line with the Office of Surface Mining Reclamation and Enforcement rule on the same subject.

(1) Responsibility. The director shall—

(A) Ensure that persons responsible for the use of explosives in surface mining operations have attended training courses which satisfy the requirements set forth in subsection (3)(A) of this rule.

(B) Govern the training, examination, certification and enforcement of a blaster certification program for surface coal mining operations.

(2) Definitions and Standards.

(A) Application. The submittal of the following constitutes application to the blaster certification program: completed application form, completed verification forms and appropriate fee by an individual interested in becoming a certified blaster in Missouri. A satisfactory application allows the applicant to take the required examination.

(B) Blast. Any detonator(s), explosive(s), blasting agent(s), or a combination of these, being initiated simultaneously by a single energy source.

(C) Blaster. A person directly responsible for the use of explosives in surface coal mining operations who is certified under this rule.

(D) Certification. The issuance of a blaster certificate to those persons examined and found to be competent and possessing the necessary experience to accept the responsibility for blasting operations in surface coal mining operations. Certification will be for three (3) years.

(E) Examination. A test designed to verify the competency of persons seeking to become certified or recertified. The examination, consisting of, at a minimum, those topics set forth in subsection (3)(A) of this rule, will be given by the Land Reclamation Program.

(F) Experience. Persons seeking to become certified or recertified as blasters in Missouri must have gained experience either through 1) being directly responsible for the use of explosives and for the direction of the blasting crew in surface blasting operations or 2) receiving on-the-job training from the certified blaster in charge. The experience for both options listed must include, but not be limited to, the technical aspects listed in subsection (3)(A) of this rule for a period of twelve (12) months within the last five (5) years.

(G) Recertification. The reissuance of a blaster certificate to those persons examined and found to be competent and possessing the necessary experience to accept the responsibility for blasting operations in surface coal mining operations. The procedures for becoming recertified are in accordance with subsection (3)(A) of this rule. Recertifications are good for three (3) years.

(H) Reexamination. Individuals who did not pass the examination with an eighty percent (80%) score will be allowed to retake the test. Those individuals will have to pay an additional fee to retake the test. The examination procedures and topics covered will be the same as those required for the initial examination process.

(I) Revocation. As determined by the Land Reclamation Commission, the certified blaster will be relieved of all his/her rights and privileges granted by the certification for at least the length of time remaining on his/her certification. This individual will be considered a new applicant and will have to submit not only the application fee, but also a reinstatement fee at application time.

(J) Surface Blasting Operations. The on-site storage, transportation and use of explosives in association with coal exploration operations, surface mining activities and surface disturbances of underground mining activities. The term shall be interpreted broadly and shall encompass activities including, but not limited to, the design of individual blasts, the implementation of blast designs, the initiation of blasts, the monitoring of airblast and ground vibration and the use of protective measures such as access control and warning and all clear signals.

(K) Suspension. As determined by the Land Reclamation Commission, the certified blaster will be relieved of all his/her rights and privileges granted by the certification

temporarily, as provided for by the terms of the suspension order. The suspension order may carry with it requirements for additional training or testing or other appropriate corrective measures.

(L) Temporary Certificate. A certificate strictly for those out-of-state blasters who presently have a valid certificate from a state with an Office of Surface Mining-approved program. These certificates are good for six (6) months or the time left on the valid out-of-state certificate, whichever is greater.

(3) Training.

(A) Persons seeking to become certified or recertified as blasters in Missouri must successfully complete one (1) formal training course within the past year prior to certification or recertification. For certification in Missouri, the course shall be at least two (2) days in length and provide training and discuss practical applications of all of the following. For recertification in Missouri, the course shall be at least one (1) day in length and provide training and discuss practical applications of least one (1) of the following:

1. Explosives, including:
 - A. Selection of the type of explosive to be used;
 - B. Determination of the properties of explosives which will produce desired results at an acceptable level of risk; and
 - C. Handling, transportation and storage;
2. Blast designs, including:
 - A. Geologic and topographic considerations;
 - B. Design of a blast hole, with critical dimensions;
 - C. Pattern design, field layout and time of blast holes; and
 - D. Field applications;
3. Loading blast holes, including priming and boosting;
4. Initiation systems and blasting machines;
5. Blasting vibrations, airblast and fly-rock, including:
 - A. Monitoring techniques; and
 - B. Methods to control adverse affects;
6. Secondary blasting applications;
7. Current federal and state rules applicable to the use of explosives;
8. Blast records;
9. Schedules;
10. Preblast surveys, including:
 - A. Availability;
 - B. Coverage; and
 - C. Use of preblast surveys in blast designs;
11. Blast plan requirements;
12. Certification and training;

13. Signs, warning signals and site control; and

14. Unpredictable hazards, including:

- A. Lightning;
- B. Stray currents;
- C. Radio waves; and
- D. Misfires.

(B) Training courses that are approved or sponsored by the following entities and fulfill those requirements outlined in paragraph (3)(C)1. of this rule will be deemed acceptable by the Missouri Land Reclamation Program for the purposes of meeting the training requirements of this rule:

1. The Office of Surface Mining of the United States Department of the Interior;
2. Other states with Office of Surface Mining-approved blaster certification programs; and
3. The federal Mine Safety and Health Administration.

(C) Other training courses will be evaluated by the Missouri Land Reclamation Commission for acceptability.

1. These training courses shall be approved based upon their equivalency to the approved programs listed in subsection (3)(A) in terms of—

- A. Course content;
- B. Instructor qualifications; and
- C. Number of instructional hours.

2. It shall be the responsibility of the applicant to provide to the Missouri Land Reclamation Program the material as may be required by the program to conduct the evaluations.

(D) Direction and on-the-job training of those persons who are not certified and who are assigned to a blasting crew or assist in the use of explosives will be the responsibility of the blaster in charge.

(4) Fees.

(A) The following is a schedule of nonrefundable fees, with the exception of subsection (4)(B) of this rule, to be submitted at the time of initial certification, recertification, reexamination, replacement, temporary certification or reinstatement:

1. Certification Application/ Issuance Fee	\$100;
2. Recertification Application/ Issuance Fee	\$100;
3. Reexamination Fee	\$ 25;
4. Certificate Replacement Fee	\$ 25;
5. Temporary Certificate Fee	\$ 25;
and	
6. Reinstatement Fee	\$100.

(B) Time Frames and Administration of Fees.

1. Should the applicant's application be rejected, seventy-five dollars (\$75) of the original fee will be returned.

2. These fees will be paid into the Mined Land Reclamation Fund.

3. Fees will be accepted by check, money order or cashier's check made payable to the State of Missouri and to be deposited in the Mined Land Reclamation Fund.

(5) Application.

(A) Application Time Frames.

1. Application to the certification program must be received by the Land Reclamation Program no later than thirty (30) days before the date of the scheduled examination.

2. Any applicant whose application has not been received by the due date will be placed on the list for the next scheduled examination.

(B) Required Information and Supplemental Forms for Application.

1. Each applicant must fully complete and submit the following for application to the blaster certification program on forms provided by the Land Reclamation Program:

A. Application form #1. Completion of this form consists of the answering of the following:

(I) Name, address, home telephone number, birth date, age, Social Security number and occupation of applicant;

(II) Name, address, business telephone number of present or most recent employer;

(III) Type of certification requested by the application;

(IV) Whether or not the applicant has completed one (1) formal course within the past twelve (12) months, as specified in subsection (3)(A) of this rule;

(V) Whether or not the applicant has had on-the-job training or supervisory experience during the past twelve (12) months as specified in subsection (2)(F) of this rule;

(VI) Personal information as specified in subparagraph (5)(C)1.D.; and

(VII) Signature of and dated by the applicant and verified by a notary public;

B. Verification of applicant's training course—form #2. Completion of this form consists of answering the following:

(I) Name, address, birth date and Social Security number of the applicant;

(II) Name of employer(s) that provided such training;

(III) Name and address of trainer, name, dates, location and type of training course; and

(IV) Statement signed and dated by trainer as to whether the trainee successfully or unsuccessfully completed training course and why course was failed;

C. Verification of applicant's experience, on-the-job training, or both, by the employer(s) that provided the experience—form #3. Completion of this form consists of answering the following:

(I) Name, address, birth date, Social Security number and occupation of applicant;

(II) Name and address of employer(s) that provided such experience;

(III) Type of certification requested by the applicant; and

(IV) Statement signed and dated by employer that provided the experience as to whether the applicant has actively performed duties of responsibilities or has had active on-the-job training or job experience as specified in subsection (2)(F) of this rule for purposes of certification or recertification; and

D. The appropriate fee(s).

(C) Criteria for Complete Application.

1. The Land Reclamation Program will review the application fee and the other forms for completeness and accuracy. The acceptance of the application will be based upon the following:

A. Age. The applicant must be twenty-one (21) at the time of certification issuance;

B. Experience. The applicant must have successfully completed twelve (12) months of active blasting experience or on-the-job training within the last five (5) years;

C. Training. The applicant must have successfully completed training as per subsection (3)(A) of this rule;

D. Personal information. Complete and accurate information regarding the following:

(I) Whether the applicant has a current addiction to alcohol, narcotics or dangerous drugs. For the purposes of this rule, addiction does not include a person who has been treated for drugs and alcohol addiction and who has been declared free of his/her habitual use by a reputable drug or alcohol treatment program; and

E. The appropriate fee.

2. The applicant will be notified no later than seven (7) days before the date of the scheduled examination that the application has either been rejected or accepted. The notification will include the reasons for the rejection.

(D) Right to Appeal. If the applicant has had his/her application rejected, s/he may submit a written appeal within thirty (30) days of the denial.

(6) Examination.

(A) The competence of persons directly responsible for the use of explosives in surface coal mining operations shall be determined through a written examination in the technical aspects of blasting and state and federal laws governing the storage, use and transportation of explosives.

(B) Applicants for blaster certification shall be examined, at a minimum, in the topics set forth in subsection (3)(A) of this rule.

(C) Time Frames for Examination.

1. Written examinations for blaster certification shall be administered at least quarterly on dates, times and at locations determined by the Land Reclamation Program. Emergency testing situations will be considered on a case-by-case basis.

2. Due dates for the application will be included in official notices.

3. The Land Reclamation Program will make available the information specified in paragraph (6)(C)1. at least sixty (60) days before the date of the examination.

(D) Examination Day.

1. The applicant must show the following, upon entering the testing room, in order to be able to take the examination:

A. Two (2) forms of identification. One (1) form of identification must include a recent photograph of the applicant. The following forms of valid identification will be accepted:

(I) Current driver's license with blaster's photograph;

(II) Certified birth certificate or certificate of live birth;

(III) Immigration card;

(IV) Passport;

(V) Court record;

(VI) Social Security card;

(VII) Current Missouri identification card; and

(VIII) Current credit card; and

B. Pass card. This card will be included in the correspondence that the applicant will receive notification of acceptance to take the test.

(E) Failure to Take Examination. Failure by the applicant to notify the Land Reclamation Program at least one (1) day in advance of the test of the applicant's inability to take the examination will result in the application being rejected and the fees forfeited.

(F) Test Results.

1. Passing the examination.

A. An eighty percent (80%) score on the examination constitutes a passing grade.

B. Those applicants who receive at least an eighty percent (80%) grade will be notified of the results within fifteen (15) working days of the examination date.

2. Failure of the examination.

A. Those applicants who did not receive at least an eighty percent (80%) grade did not pass the test. These individuals will be notified of the test results within fifteen (15) working days of the examination date.

B. Those applicants who did not pass the test may retake a reexamination at the next regularly scheduled date on the following two (2) conditions:

(I) The applicant must inform the Land Reclamation Program in writing of the desire to retake the examination at least thirty (30) days before the scheduled exam in order for that applicant to be on the testing list; and

(II) The applicant must submit the twenty-five dollar (\$25) reexamination fee along with the statement of intent.

3. Review of failed examination.

A. The applicant may request to review the test at the Land Reclamation Program office during regular business hours.

B. Under no circumstances will any applicant or his/her agent be able to record examination questions by any means during this review.

C. Applicants will not be allowed to review their tests less than fifteen (15) days prior to their scheduled reexamination.

(7) Certification.

(A) Issuance of Certification.

1. The director shall certify, for a period of three (3) years, those candidates examined and found to be competent and to have the necessary experience to accept the responsibility for blasting operations in surface coal mining operations.

2. Certificates will be issued within fifteen (15) working days after the date of the examination.

(B) Criteria for Certification. The following is a list of criteria which will be used to determine whether or not a certificate will be issued at the time of initial certification or for recertification:

1. Age. The applicant must have turned twenty-one (21) at the time of certification issuance;

2. Experience. The applicant must have had twelve (12) months of active blasting experience as specified in subsection (2)(F) of this rule;

3. Training. The applicant must have had one (1) formal training course within the past year. The course must cover at least one (1) of those technical aspects as specified in subsection (3)(A) of this rule;

4. Personal information. The applicant shall not—

A. Be currently addicted to alcohol, narcotics or dangerous drugs; or

B. Exhibit a pattern of conduct inconsistent with the acceptance of responsibility for blasting operations; and

5. Pass the examination with at least an eighty percent (80%) grade.

(C) Certificate Conditions. The following conditions must be met for a blaster to maintain certification:

1. A blaster shall immediately exhibit his/her certificate to any authorized representative of the Land Reclamation Commission or the Office of Surface Mining Reclamation and Enforcement upon request;

2. Blaster's certifications shall not be assigned or transferred;

3. Blasters shall not delegate their responsibility to any individual who is not certified;

4. Blasters shall take every reasonable precaution to protect their certificates from loss, theft or unauthorized duplication. Any such occurrence shall be reported immediately to the director;

5. The blaster must have the certificate on his/her person at the mine site;

6. The blaster's responsibility is to conduct blasting and provide on-the-job training to noncertified crew members; and

7. The blaster must submit a written notification as soon as practicable to the Land Reclamation Program when there is a change in his/her name, address, phone number or place of employment.

(D) Right to Appeal. If the applicant has had his/her certificate denied, s/he may submit a written appeal within thirty (30) days of the denial.

(E) Recertification.

1. To maintain certification, blasters are required to receive additional training that meets the applicable requirements of subsection (3)(A) of this rule every three (3) years.

2. After completion of the updated training and prior to the expiration of their current three (3)-year certification period, blasters must retake and pass the examination required in section (6) of this rule to keep their certification valid.

3. The Land Reclamation Program will notify the certified blaster before his/her certification is scheduled to expire.

4. The certified blaster will have a ninety (90)-day grace period from the date of expiration of his/her certificate in which to become recertified without a lapse of certification.

5. Administration actions on recertification applications.

A. If a blaster's certificate is suspended or revoked, a recertification applica-

tion will be accepted and processed only in accordance with the regulations and only if the terms and conditions of the suspension or revocation orders have been met.

B. If an application for recertification has been submitted, and prior to recertification, the certificate is suspended or revoked, the recertification application will be rendered null and void and returned to the applicant.

(F) Reciprocity.

1. Any person who holds a valid certificate of registration as a certified blaster in another state may be granted a temporary blaster certificate as specified in this rule on the conditions that—

A. The state which issued the certificate has an office of surface mining approved blaster certification program; and

B. The blaster presents to the Land Reclamation Program his/her valid blaster certificate or provide the Land Reclamation Program with the name of the state where the certificate was issued and the certification number.

2. The period of the temporary certificate shall not exceed the balance of the time left on the blaster's original certificate, or six (6) months, whichever is greater.

3. Prior to the expiration of a temporary certificate, the blaster must reapply under the requirements for recertification. Temporarily certified blasters will have a ninety (90)-day grace period from the date of expiration of his/her certificate in which to become recertified without a lapse of certification.

(G) Suspension and Revocation.

1. The permittee shall be responsible to take such steps as are necessary to ensure that blasting operations conducted on a permit issued to him/her are conducted under the direction of a certified blaster in accordance with the applicable laws and the regulations of the Land Reclamation Commission.

2. After a finding of willful misconduct, and following written notice and opportunity for a hearing, the commission may suspend or revoke the certification of a blaster or take other action for any of the following reasons:

A. Noncompliance with any order or notice of the director or commission;

B. Current addition to or unlawful use of alcohol, narcotics or other dangerous drugs in the work place;

C. Violation of any provision of the state or federal explosives laws or regulations including subsection (7)(C); and

D. Providing false information or a misrepresentation to obtain certification.

3. If the director determines that a certificate should be revoked or suspended pursuant to paragraph (7)(G)2. of this rule, s/he

shall issue an order to the blaster by certified mail or hand delivery requiring him/her to show cause why his/her certificate and right to conduct blasting operations under the regulatory blaster certification program should not be suspended or revoked.

A. Upon receipt of the show cause order, the blaster shall have thirty (30) days in which to request a hearing before the commission to show cause why the certificate should not be suspended or revoked. If a hearing is requested, it shall be held within sixty (60) days of the receipt of the request by the commission.

B. If the permittee fails to request a hearing within the time allowed, the matters set forth in the show cause order shall be conclusive and the commission shall declare the certificate revoked or suspended at the first regularly scheduled commission meeting following the expiration of the thirty (30)-day period provided to request a hearing.

C. The blaster shall be provided with a copy of any inspection report prepared by an authorized representative of the commission which discusses or notes any aspect of the blaster's performance or the conduct of blasting operations under his/her supervision.

4. The director or an authorized representative of the commission shall immediately issue a suspension order if s/he determines that any condition or practice, listed in subparagraphs (7)(G)2.A.—D. or any condition outlined in paragraphs (7)(C)1.—7. imposed upon a certificate issued by the program, or any violation of the regulatory blaster certification program outlined in this rule—

A. Creates an imminent danger to the health or safety of the public; or

B. Is causing or can reasonably be expected to cause significant, imminent environmental harm to land, air or water resources.

5. If advance notice and opportunity for a hearing cannot be provided due to the circumstances described in paragraph (7)(G)4., an opportunity for a hearing shall be provided as soon as practical following the suspension and, in any case, no later than fifteen (15) days after the suspension.

6. If a hearing is held pursuant to paragraph (7)(G)3. or 5. of this rule, or upon failure of the blaster to request a hearing as provided for, the commission shall issue written Findings of Fact and Conclusions of Law and, if appropriate, an order suspending or revoking the certificate within forty-five (45) days after the hearing.

A. An order of suspension shall include:

(I) The termination date of the suspension; and

(II) The conditions that must be complied with prior to termination of suspension.

B. An order of revocation shall include:

(I) The period of time, if any, beyond the expiration date of the blaster's current certification during which s/he shall be ineligible to apply for recertification; and

(II) The conditions that must be complied with prior to the applicant being eligible for recertification.

C. An order of revocation or suspension may include requirements that the blaster complete additional training or testing or for other appropriate corrective measures.

7. All notices, suspension or revocation orders will be served to the blaster promptly after issuance. Service may be in person, certified mail, return receipt requested.

A. Service by mail will be deemed complete upon deposit with the United States mail, postage prepaid and addressed to the address provided by the blaster to the Land Reclamation Program.

B. A copy of the notice or order will be mailed to the permittee, the primary employer and any other person who employs that blaster.

8. Upon issuance of a suspension or revocation order, all rights and privileges granted by certification are suspended or revoked until the order is vacated or the certification is restored in accordance with the suspension or revocation order.

9. The blaster will surrender his/her certificate when an order is issued by the director or commission. If the order is hand delivered, the certificate will be immediately surrendered. Otherwise, the certificate may be sent by certified mail, return receipt requested or by registered mail.

10. Prior to a hearing, a suspension or revocation order determined to have been issued in error may be vacated immediately by the director.

11. The terms and conditions of each order given by the Land Reclamation Commission will be commensurate with the following:

A. Seriousness of the violation;

B. The blaster's culpability for the violation;

C. The history of the blaster's performance; and

D. Consideration of whether the blaster took precautions to ensure compliance with the laws and regulations.

12. All hearings conducted under the authority of this section shall be in accordance with the applicable provisions of section 444.875.7, RSMo.

dance with the applicable provisions of section 444.875.7, RSMo.

AUTHORITY: section 444.810, RSMo 1994. Original rule filed June 3, 1985, effective Oct. 28, 1985. Rescinded and readopted: Filed June 2, 1988, effective Aug. 25, 1988.*

**Original authority 1979, amended 1983, 1993.*



MISSOURI DEPARTMENT OF NATURAL RESOURCES
LAND RECLAMATION PROGRAM
APPLICATION FOR BLASTER CERTIFICATION

NOTE ▶ To be completed by applicant. Please use typewriter or print in ink.			
NAME (LAST, FIRST, MIDDLE)		BIRTHDATE (MONTH, DAY, YEAR)	
ADDRESS	CITY	STATE	ZIP CODE
SOCIAL SECURITY NUMBER	AGE	OCCUPATION	
HOME TELEPHONE NUMBER		BUSINESS TELEPHONE NUMBER	
CURRENT OR MOST RECENT EMPLOYER(S) PLEASE INDICATE IF APPLICANT IS A CONTRACT BLASTER; AND LIST THOSE COMPANIES THAT EMPLOY HIM/HER. (ATTACH PAGES IF NECESSARY.)			
COMPANY ADDRESS(ES)			
SPECIFY THE TEST DATE THE APPLICANT WISHES TO ATTEND _____			
PLEASE CHECK IF FEE HAS BEEN INCLUDED _____			
<p>TYPE OF CERTIFICATION REQUESTED (CHECK ONE)</p> <p><input type="checkbox"/> INITIAL CERTIFICATION</p> <p><input type="checkbox"/> RECERTIFICATION CERTIFICATION NUMBER _____</p> <p><input type="checkbox"/> TEMPORARY CERTIFICATION (PROVIDE THE NAME OF THE STATE WHERE ISSUED AND THE NUMBER OF YOUR VALID CERTIFICATE, OR INCLUDE YOUR CERTIFICATE HERE.)</p> <p>STATE _____ CERTIFICATION NUMBER _____</p>			
<p>TRAINING REQUIREMENTS</p> <p>HAVE YOU SUCCESSFULLY COMPLETED ONE FORMAL TRAINING COURSE IN THE PAST 12 CONSECUTIVE MONTHS, LASTING AT LEAST ONE DAY FOR RECERTIFICATION OR AT LEAST TWO DAYS FOR INITIAL CERTIFICATION?</p> <p><input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>PLEASE LIST THE INITIAL OR RECERTIFICATION TRAINING COURSES(S) COMPLETED BY THE APPLICANT IN THE PAST 12 MONTHS. INCLUDE NAME OF COURSE, COURSE INSTRUCTOR, AND DATES OF COURSE. (ATTACH PAGES IF NECESSARY)</p>			

MO 780-1159 (6-88)



EXPERIENCE REQUIREMENTS

HAVE YOU SUCCESSFULLY COMPLETED ON-THE-JOB BLASTER TRAINING OR SUPERVISORY EXPERIENCE FOR A PERIOD OF 12 MONTHS IN THE PAST FIVE YEARS?

YES NO

HAVE YOU INCLUDED ALL VERIFICATION FORMS INCLUDING VERIFICATION OF BLASTING EXPERIENCE, ON THE JOB TRAINING, AND VERIFICATION OF BLASTING TRAINING COURSE? _____

PLEASE LIST EMPLOYER(S) THAT HAVE PROVIDED EXPERIENCE OR ON THE JOB TRAINING AND LENGTH OF TIME EMPLOYED AT EACH COMPANY FOR AT LEAST 12 MONTHS DURING THE PAST FIVE YEARS. (ATTACH PAGES IF NECESSARY)

PERSONAL INFORMATION: MUST BE FILLED OUT COMPLETELY

DO YOU HAVE AN ADDICTION TO ALCOHOL, NARCOTICS, OR OTHER DANGEROUS DRUGS? FOR THE PURPOSES OF THIS RULE (10 CSR 40-3.160 (5)(c)1.D.) ADDICTS DO NOT INCLUDE PERSONS WHO HAVE BEEN TREATED FOR DRUGS OR ALCOHOL ADDICTION AND WHO HAVE BEEN DECLARED FREE OF THEIR HABITUAL USE BY A REPUTABLE DRUG OR ALCOHOL TREATMENT PROGRAM.

YES NO

BY THE NOTARIZED SIGNATURE BELOW, I HEREBY AFFIRM THAT ALL OF THE INFORMATION COMPLETED ABOVE ARE TRUE AND ACCURATE STATEMENTS.

APPLICANT'S SIGNATURE _____ DATE _____

SIGNED IN THE PRESENCE OF NOTARY PUBLIC.

NOTARY PUBLIC EMBOSSEER SEAL	STATE	COUNTY (OR CITY OF ST. LOUIS)
	SUBSCRIBED AND SWORN BEFORE ME, THIS	
	DAY OF	19
	USE RUBBER STAMP IN CLEAR AREA BELOW.	
NOTARY PUBLIC SIGNATURE	MY COMMISSION EXPIRES	
NOTARY PUBLIC NAME (TYPED OR PRINTED)		

MAIL TO:

DIRECTOR
MISSOURI DEPARTMENT OF NATURAL RESOURCES
LAND RECLAMATION PROGRAM
P.O. BOX 176
JEFFERSON CITY, MISSOURI 65102



MISSOURI DEPARTMENT OF NATURAL RESOURCES
LAND RECLAMATION PROGRAM

VERIFICATION OF BLASTING EXPERIENCE AND ON-THE-JOB TRAINING

NOTE ▶ To be completed by employer that provided such experience.			
NAME OF APPLICANT (LAST, FIRST, MIDDLE)		BIRTHDATE (MONTH, DAY, YEAR)	
ADDRESS	CITY	STATE	ZIP CODE
SOCIAL SECURITY NUMBER		OCCUPATION	
NAME OF EMPLOYER THAT PROVIDED SUCH EXPERIENCE			
ADDRESS OF EMPLOYER THAT PROVIDED SUCH EXPERIENCE		CITY	STATE
			ZIP CODE
<p>Answer every question in the appropriate boxes below. Complete either initial certification category or recertification category.</p> <p>INITIAL CERTIFICATION: Complete if applicant has working experience.</p> <p>The applicant indicated above has gained experience (including but not limited to those technical aspects listed in 10 CSR 40-3.160 (3) (A)) (See reverse side) through being directly responsible for the use of explosives and for the direction of the blasting crew for a period of 12 months within the past five years.</p> <p><input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>INITIAL CERTIFICATION: Complete if applicant has on-the-job training.</p> <p>The applicant indicated above has received on-the-job training (including, but not limited to those technical aspects listed in 10 CSR 40-3.160 (3)(A)) under the direction of the blaster in charge for a period of 12 months within the past five years.</p> <p><input type="checkbox"/> YES <input type="checkbox"/> NO</p>			
<p>RECERTIFICATION: Complete if the applicant has work experience and is applying for recertification.</p> <p>The applicant indicated above has gained experience (including but not limited to those technical aspects listed in 10 CSR 40-3.160 (3)(A)) through being directly responsible for the use of explosives and for the direction of the blasting crew for a period of 12 months within the past five years.</p> <p><input type="checkbox"/> YES <input type="checkbox"/> NO</p>			
<p>STATEMENT BY EMPLOYER THAT PROVIDED SUCH EXPERIENCE:</p> <p>The applicant has successfully completed the above-indicated requirements for certification/recertification.</p> <p><input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>Do you know of any reason why this person should not be certified:</p> <p><input type="checkbox"/> YES (Explain) _____</p> <p>_____</p> <p>_____</p> <p><input type="checkbox"/> NO</p>			
SIGNATURE OF EMPLOYER		TITLE	DATE
<p>MAIL TO: DIRECTOR MISSOURI DEPARTMENT OF NATURAL RESOURCES LAND RECLAMATION PROGRAM P.O. BOX 176 JEFFERSON CITY, MO 65102</p>			

MO 780-1160 (6-88)

COURSE CONTENT REQUIREMENTS

- (1) Explosives, including—
 - (i) Selection of the type of explosive to be used;
 - (ii) Determination of the properties of explosives which will produce desired results at an acceptable level of risk; and
 - (iii) Handling, transportation, and storage
- (2) Blast designs, including—
 - (i) Geologic and topographic considerations;
 - (ii) Design of a blast hole, with critical dimensions;
 - (iii) Pattern design, field layout, and timing of blast holes; and
 - (iv) Field applications;
- (3) Loading blastholes, including priming and boosting;
- (4) Initiation systems and blasting machines;
- (5) Blasting vibrations, airblast, and flyrock, including—
 - (i) Monitoring techniques, and
 - (ii) Methods to control adverse effects;
- (6) Secondary blasting applications;
- (7) Current Federal and State rules applicable to the use of explosives;
- (8) Blast records;
- (9) Schedules;
- (10) Preblasting surveys, including—
 - (i) Availability,
 - (ii) Coverage, and
 - (iii) Use of preblast surveys in blast design;
- (11) Blast-plan requirements;
- (12) Certification and training;
- (13) Signs, warning signals, and site control;
- (14) Unpredictable hazards, including—
 - (i) Lightning,
 - (ii) Stray currents,
 - (iii) Radio waves; and
 - (iv) Misfires.



MISSOURI DEPARTMENT OF NATURAL RESOURCES
LAND RECLAMATION COMMISSION
VERIFICATION OF BLASTING TRAINING COURSE

NOTE ▶ To be completed by course instructor/company representative conducting training.			
NAME OF TRAINEE (LAST, FIRST, MIDDLE)		BIRTHDATE (MONTH, DAY, YEAR)	
ADDRESS OF TRAINEE	CITY	STATE	ZIP CODE
SOCIAL SECURITY NUMBER	NAME OF EMPLOYER(S) THAT PROVIDED SUCH TRAINING		
NAME, DATES, AND LOCATION OF TRAINING COURSE			
NAME OF COURSE INSTRUCTOR			
ADDRESS OF COURSE INSTRUCTOR	CITY	STATE	ZIP CODE
TYPE OF TRAINING COURSE			
<input type="checkbox"/> INITIAL (APPLICANT MUST HAVE COMPLETED AT LEAST ONE TWO-DAY COURSE WHICH COVERED ALL ITEMS LISTED UNDER "COURSE CONTENT REQUIREMENTS." SEE REVERSE SIDE.)			
<input type="checkbox"/> REFRESHER (APPLICANT MUST HAVE COMPLETED A ONE-DAY COURSE WHICH COVERED AT LEAST ONE OF THE ITEMS LISTED UNDER "COURSE CONTENT REQUIREMENTS." SEE REVERSE SIDE.)			
STATEMENT BY COURSE INSTRUCTOR			
THE TRAINEE HAS SUCCESSFULLY COMPLETED THE TRAINING COURSE.			
<input type="checkbox"/> YES <input type="checkbox"/> NO			
IF THE ANSWER ABOVE IS NO, PLEASE STATE THE CIRCUMSTANCES.			

SIGNATURE OF COURSE INSTRUCTOR		DATE	
MAIL TO: DIRECTOR MISSOURI DEPARTMENT OF NATURAL RESOURCES LAND RECLAMATION PROGRAM P.O. BOX 176 JEFFERSON CITY, MO 65102			

MO 780-1161 (6-88)

COURSE CONTENT REQUIREMENTS

- (1) Explosives, including—
 - (i) Selection of the type of explosive to be used;
 - (ii) Determination of the properties of explosives which will produce desired results at an acceptable level of risk; and
 - (iii) Handling, transportation, and storage
- (2) Blast designs, including—
 - (i) Geologic and topographic considerations;
 - (ii) Design of a blast hole, with critical dimensions;
 - (iii) Pattern design, field layout, and timing of blast holes; and
 - (iv) Field applications;
- (3) Loading blastholes, including priming and boosting;
- (4) Initiation systems and blasting machines;
- (5) Blasting vibrations, airblast, and flyrock, including—
 - (i) Monitoring techniques, and
 - (ii) Methods to control adverse effects;
- (6) Secondary blasting applications;
- (7) Current Federal and State rules applicable to the use of explosives;
- (8) Blast records;
- (9) Schedules;
- (10) Preblasting surveys, including—
 - (i) Availability,
 - (ii) Coverage, and
 - (iii) Use of preblast surveys in blast design;
- (11) Blast-plan requirements;
- (12) Certification and training;
- (13) Signs, warning signals, and site control;
- (14) Unpredictable hazards, including—
 - (i) Lightning,
 - (ii) Stray currents,
 - (iii) Radio waves, and
 - (iv) Misfires.

10 CSR 40-3.170 Signs and Markers for Underground Operations

PURPOSE: This rule sets forth general requirements as to signs and markers applicable to permanent performance requirements for underground coal mining in keeping with sections 444.810 and 444.860, RSMo.

(1) Specifications. Signs and markers required under this chapter shall—

(A) Be posted, maintained and removed by the person who conducts the underground mining activities;

(B) Be of a uniform design throughout the activities that can be easily seen and read;

(C) Be made of durable material; and

(D) Conform to local laws and regulations.

(2) Duration of Maintenance. Signs and markers shall be maintained during all activities to which they pertain.

(3) Mine and Permit Identification Signs.

(A) Identification signs shall be displayed at each point of access from public roads to areas of surface operations and facilities on permit areas for underground mining activities.

(B) Signs will show the name, business address and telephone number of the person who conducts underground mining activities and the identification number of the current permit authorizing underground mining activities.

(C) Signs shall be retained and maintained until after the release of all bonds for the permit area.

(4) Perimeter Markers. Each person who conducts underground mining activities shall clearly mark the perimeter of all areas affected by surface operations or facilities before beginning mining activities.

(5) Bonded Area Markers. Where the permit area is bonded incrementally, the area bonded shall be clearly marked before the beginning of surface mining activities.

(6) Buffer Zone Markers. Buffer zones required by 10 CSR 40-3.200(16) shall be clearly marked to prevent disturbance by surface operations and facilities.

(7) Topsoil Markers. Where topsoil or other vegetation supporting material is segregated and stockpiled as required under 10 CSR 40-3.190(3), the stockpiled material shall be clearly marked.

AUTHORITY: section 444.810, RSMo 1994. *Original rule filed Aug. 8, 1980, effective Dec. 11, 1980. Amended: Filed Jan. 5, 1987, effective July 1, 1987. Amended: Filed July 3, 1990, effective Nov. 30, 1990.

*Original authority 1979, amended 1983, 1993.

10 CSR 40-3.180 Casing and Sealing of Exposed Underground Openings

PURPOSE: This rule sets forth the requirements for casing and sealing of exposed underground holes pursuant to sections 444.810, 444.855.2(3)(iii) and 444.860, RSMo.

Editor's Note: The secretary of state has determined that the publication of this rule in its entirety would be unduly cumbersome or expensive. The entire text of the material referenced has been filed with the secretary of state. This material may be found at the Office of the Secretary of State or at the headquarters of the agency and is available to any interested person at a cost established by law.

(1) General Requirements. Each exploration hole, other drillhole or borehole, shaft, well or other exposed underground opening shall be cased, lined or otherwise managed as approved in the permit and plan to prevent acid or other toxic drainage from entering ground and surface waters, to minimize disturbance to the prevailing hydrologic balance and to ensure the safety of people, livestock, fish and wildlife, and machinery in the mine plan and adjacent area. Each exploration hole, drillhole or borehole or well that is uncovered or exposed by mining activities within the permit area shall be permanently closed, unless approved for water monitoring or otherwise managed in a manner approved in the permit and plan. Use of a drilled hole or monitoring well as a water well must meet the provisions of 10 CSR 40-3.200(12). This section does not apply to holes drilled and used for blasting in the surface area affected by underground operations.

(2) Temporary Casing and Sealing of Underground Openings.

(A) Each mine entry, which is temporarily inactive but has a further projected useful service under the approved permit application, shall be protected by barricades or other covering devices, fenced and posted with signs to prevent access into the entry and to identify the hazardous nature of the opening. These devices shall be periodically inspected and maintained in good operating condition

by the person who conducts the underground mining activities.

(B) Each exploration hole, other drillhole or borehole, shaft, well and other exposed underground opening which has been identified in the approved permit and plan for use to return underground development waste, coal processing waste to underground workings, or to be used to monitor groundwater conditions shall be temporarily sealed until actual use.

(3) Permanent Casing and Sealing of Underground Openings. When no longer needed for monitoring or other use approved in the permit and plan, upon a finding of no adverse environmental or health and safety effects, or unless approved for transfer as a water well under 10 CSR 40-3.200(12), each shaft, drift, adit, tunnel, exploratory hole, entryway or other opening to the surface from underground shall be capped, sealed, back-filled or otherwise properly managed as required in the permit and plan under section (1) and 10 CSR 40-3.200(10) and consistent with 30 CFR 75.1771. Permanent closure measures shall be designed to prevent access to the mine workings by people, livestock, fish and wildlife, machinery and to keep acid or other toxic drainage from entering ground or surface waters.

AUTHORITY: section 444.810, RSMo 1994. *Original rule filed Aug. 8, 1980, effective Dec. 11, 1980.

*Original authority 1979, amended 1983, 1993.

10 CSR 40-3.190 Requirements for Topsoil Removal, Storage and Redistribution for Underground Operations

PURPOSE: This rule sets forth the requirements for topsoil removal, storage and redistribution pursuant to sections 444.810, 444.855.2(5) and 444.860, RSMo.

(1) General Requirements.

(A) Before disturbance of areas affected by surface operations, topsoil and subsoils to be saved under section (2) of this rule shall be separately removed and segregated from other material.

(B) After removal, topsoil shall either be immediately redistributed, as required under section (4) of this rule, or stockpiled pending redistribution, as required under section (3) of this rule.

(C) Topsoil and subsoils to be saved under section (2) of this rule shall be removed twenty-five feet (25') in advance of mining, unless otherwise stated in the permit.

(2) Topsoil Removal.

(A) Timing. Topsoil shall be removed from surface areas to be affected by underground or major structures, after vegetative cover that would interfere with the use of the topsoil is cleared from portions of those areas that will be disturbed, but before any drilling for blasting, mining or other disturbance of surface lands.

(B) Materials to be Removed. Topsoil shall be removed in a separate layer from the areas to be disturbed, unless use of substitute or supplemental materials is approved in the permit and plan in accordance with subsection (2)(E) of this rule. If use of substitute or supplemental materials is approved, all materials to be redistributed shall be removed.

(C) Material to be Removed in Thin Topsoil Situations. If the topsoil is less than six inches (6"), a six-inch (6") layer that includes the A horizon and the unconsolidated materials immediately below the A horizon, or the A horizon and all unconsolidated material if the total available is less than six inches (6"), shall be removed and the mixture segregated and redistributed as the surface soil layer, unless topsoil substitutes are approved in the permit and plan pursuant to subsection (2)(E) of this rule.

(D) Subsoil Segregation. The B horizon and portions of the C horizon, or other underlying layers demonstrated to have qualities for comparable root development, shall be segregated and replaced as subsoil, if the permit and plan requires that either of these is necessary or desirable to ensure soil productivity consistent with the approved postmining land use.

(E) Topsoil Substitutes and Supplements.

1. Selected overburden materials may be substituted for, or used as a supplement to, topsoil, if in the permit and plan, it is determined that the resulting soil medium is equal to or more suitable for sustaining the vegetation than is the available topsoil and the substitute material is the best available to support the vegetation. This determination shall be based on the results of—

A. Chemical and physical analyses of overburden and topsoil. These analyses shall include determinations of pH, net acidity or alkalinity, phosphorus, potassium, texture class and other analyses as required in the permit and plan. It also may be required in the permit and plan that results of field-site trials or greenhouse tests be used to demonstrate the feasibility of using these overburden materials; or

B. Analyses, trials and tests shall be submitted to the director. Certification of trials and tests shall be made by a laboratory

approved by the commission or director stating that the—

(I) Proposed substitute material is equal to or more suitable for sustaining the vegetation than is the available topsoil;

(II) Substitute material is the best available material to support the vegetation; and

(III) Trials and tests were conducted using standard testing procedures.

2. Substituted or supplemented material shall be removed, segregated and replaced in compliance with the requirements for topsoil under this section.

(F) Limits on Topsoil Removal Area. Where the removal of vegetative material, topsoil or other materials may result in erosion which may cause air or water pollution—

1. The size of the area from which topsoil is removed at any one time shall be limited;

2. The surface soil layer shall be redistributed at a time when the physical and chemical properties of topsoil can be protected and erosion can be minimized; and

3. Other measures shall be taken as approved or required in the permit and plan.

(3) Topsoil Storage.

(A) Topsoil and other materials removed under section (2) of this rule shall be stockpiled only when it is impractical to promptly redistribute these materials on regraded areas.

(B) Stockpiled materials shall be selectively placed on a stable surface area within the permit area, not disturbed and protected from wind and water erosion, unnecessary compaction and contaminants which lessen the capability of the materials to support vegetation when redistributed.

1. Protection measures shall be accomplished either by—

A. An effective cover of nonnoxious, quick-growing annual and perennial plants, seeded or planted during the first normal period after removal for favorable planting conditions; or

B. Other methods demonstrated to and approved in the permit and plan to provide equal protection.

2. Unless approved in the permit and plan, stockpiled topsoil and other materials shall not be moved until required for redistribution on a disturbed area.

(4) Topsoil Redistribution.

(A) After final grading and before the replacement of topsoil and other materials segregated in accordance with section (3) of this rule, regraded land shall be scarified or otherwise treated as required in the permit

and plan to eliminate slippage surfaces and to promote root penetration. If the person who conducts underground mining activities shows, through appropriate tests, and the commission or director approves, that no harm will be caused to the topsoil and vegetation, scarification may be conducted after topsoiling.

(B) Topsoil and other materials shall be redistributed in a manner that—

1. Achieves an approximate uniform, stable thickness consistent with the postmining land uses, slopes and surface drainage system;

2. Prevents excess compaction of the topsoil; and

3. Protects the topsoil from wind and water erosion before and after it is seeded and planted.

(5) Topsoil Nutrients and Soil Amendments. Nutrients and soil amendments in the amounts determined by soil tests shall be applied to the redistributed surface soil layer so that it supports the approved postmining land use and meets the revegetation requirements of rule 10 CSR 40-3.270. All soil tests shall be performed by a qualified laboratory using standard methods approved in the permit and plan.

AUTHORITY: section 444.810, RSMo 1994. Original rule filed Aug. 8, 1980, effective Dec. 11, 1980. Amended: Filed July 3, 1990, effective Nov. 30, 1990.*

**Original authority 1979, amended 1983, 1993.*

10 CSR 40-3.200 Requirements for Protection of the Hydrologic Balance for Underground Operations

PURPOSE: This rule sets forth the requirements for protection of the hydrologic balance pursuant to sections 444.810, 444.855.2(10) and 444.860, RSMo.

PUBLISHER'S NOTE: The publication of the full text of the material that the adopting agency has incorporated by reference in this rule would be unduly cumbersome or expensive. Therefore, the full text of that material will be made available to any interested person at both the Office of the Secretary of State and the office of the adopting agency, pursuant to section 536.031.4, RSMo. Such material will be provided at the cost established by state law.

(1) General Requirements.

(A) Underground mining activities shall be planned and conducted to minimize changes

to the prevailing hydrologic balance in both the mine plan and adjacent areas in order to prevent long-term adverse changes in that balance that could result from those activities.

(B) Mining activities shall be conducted to prevent material damage to the hydrologic balance outside the permit area.

(C) Changes in water quality and quantity, in the depth to groundwater and in the location of surface water drainage channels shall be minimized so that the approved postmining land use of the permit area is not adversely affected.

(D) In no case shall federal and state water quality statutes, regulations, standards or effluent limitations be violated.

(E) Operations shall be conducted to minimize water pollution and, where necessary, treatment methods shall be used to control water pollution.

1. Each person who conducts underground mining activities shall emphasize mining and reclamation practices that prevent or minimize water pollution. Changes in flow shall be used in preference to the use of water treatment facilities.

2. Acceptable practices to control and minimize water pollution include, but are not limited to:

- A. Stabilizing disturbed areas through land shaping;
- B. Diverting runoff;
- C. Achieving quickly germinating and growing stands of temporary vegetation;
- D. Regulating channel velocity of water;
- E. Lining drainage channels with rock or vegetation;
- F. Mulching;
- G. Selectively placing and sealing acid- and toxic-forming materials;
- H. Designing mines to prevent gravity drainage of acid waters;
- I. Sealing;
- J. Controlling subsidence; and
- K. Preventing acid-mine drainage.

3. If the practices listed in paragraph (1)(D)2. of this rule are not adequate to meet the requirements of this rule, the person who conducts underground mining activities shall operate and maintain the necessary water treatment facilities for as long as treatment is required under this rule.

(2) Water Quality Standards and Effluent Limitations.

(A) General Limitations.

1. All surface drainage from the disturbed area, including disturbed areas that have been graded, seeded or planted, shall be passed through a siltation structures, a series

of siltation structures or a treatment facility before leaving the permit area. Any discharge of water from underground workings to surface waters which does not meet the effluent limitations of this section shall also be passed through a siltation structures, a series of siltation structures or a treatment facility before leaving the permit area.

2. Siltation structures and treatment facilities for surface drainage from the disturbed area shall be maintained until the disturbed area has been restored and the vegetation requirements of 10 CSR 40-3.270 are met and the quality of the untreated drainage from the disturbed area meets the applicable state and federal water quality standards requirements for the receiving stream. Siltation structures and treatment facilities for discharges from underground workings shall be maintained until either the discharge continuously meets the effluent limitations of this section without treatment or until the discharge has permanently ceased.

3. Exemptions may be granted in the permit and plan from these requirements only when—

A. The person who conducts the underground mining activities demonstrates that siltation structures and treatment facilities are not necessary for the drainage to be exempted to meet the effluent limitations of this section or the applicable state and federal water quality requirements for downstream receiving waters; and

B. The person who conducts the underground mining demonstrates that, for drainage from—

(I) Areas affected by surface operations and facilities, the disturbed surface drainage area within the total disturbed surface area is small and there is no mixture of surface drainage with a discharge from underground workings; or

(II) Underground mine workings, there is no mixture of that drainage with drainage from surface areas.

4. Disturbed area. For the purposes of this section only, disturbed area shall not include those areas affected by surface operations in which only diversion ditches, siltation structures or roads are installed in accordance with this rule and the upstream area is not otherwise disturbed by the person who conducts the underground mining activities.

5. Siltation structures required by this section shall be constructed in accordance with section (6) of this rule, in appropriate locations, before beginning any underground mining activities in the affected drainage area.

6. Where the siltation structures or series of siltation structures are used so as to

result in the mixing of drainage from the disturbed areas with drainage from other areas not disturbed by current surface coal mining and reclamation operations, the permittee shall achieve the effluent limitations listed for all of the mixed drainage when it leaves the permit area.

(B) Discharges of water from areas disturbed by underground mining activities shall be made in compliance with all applicable state and federal water quality laws and regulations and with the effluent limitations for coal mining promulgated by the Missouri Clean Water Commission set forth in 10 CSR 20-7.015 and promulgated by the federal government set forth in the Federal Water Pollution Control Act, P.L. 92-500, 92nd Congress.

(C) Adequate facilities shall be installed, operated and maintained to treat any water discharged from the disturbed area or discharged from the underground mine, so that it complies with all federal and state laws and regulations and the limitations of this section. If the pH of water to be discharged from the disturbed area or mine is less than 6.0, an automatic lime feeder or other automatic neutralization process approved in the permit and plan shall be installed, operated and maintained. The permit and plan may authorize the use of a manual system if it finds that—

1. Flow is infrequent and presents small and infrequent treatment requirements to meet applicable standards which do not require use of an automatic neutralization process; and

2. Timely and consistent treatment is ensured.

(3) Diversions and Conveyance of Overland Flow Shallow Groundwater Flow and Ephemeral Streams. Overland flow, including flow through litter and shallow groundwater flow from undisturbed areas and flow in ephemeral streams may be diverted away from disturbed areas by means of temporary or permanent diversions, if required or approved in the permit and plan as necessary to minimize erosion, to reduce volume of water to be treated and to prevent or remove water from contact with acid- and toxic-forming materials. The following requirements shall be met for all diversions and all collection drains that are used to transport waters into water treatment facilities and all diversions of overland and shallow groundwater flow and ephemeral streams:

(A) Temporary diversions shall be constructed to pass safely the peak runoff from a precipitation event with a two (2)-year recur-

rence interval or a larger event as specified in the permit and plan;

(B) To protect fills and property and to avoid danger to public health and safety, permanent diversions shall be constructed to pass safely the peak runoff from a precipitation event with a ten (10)-year recurrence interval or a larger event as specified in the permit and plan. Permanent diversions shall be constructed with gently sloping banks that are stabilized by vegetation. Asphalt, concrete or other similar linings shall be used only when approved in the permit and plan to prevent seepage or to provide stability;

(C) To the extent possible using the best technology currently available diversions shall be designed, constructed and maintained in a manner which prevents additional contributions of suspended solids to stream flow and to runoff outside the permit area. Appropriate sediment control measures for these diversions may include, but not be limited to, maintenance of appropriate gradients, channel lining, revegetation, roughness structures and detention basins;

(D) No diversion shall be located so as to increase the potential for landslides and no diversion shall be constructed on existing slides unless approved in the permit and plan;

(E) When no longer needed, each temporary diversion shall be removed and the affected land regraded, topsoiled and revegetated in accordance with 10 CSR 40-3.190(4) and (5), 10 CSR 40-3.260 and 10 CSR 40-3.270;

(F) Diversion design shall incorporate the following:

1. Channel linings shall be designed using standard engineering practices to safely pass the design velocities. Riprap shall comply with the requirements of 10 CSR 40-3.220(2)(B)4., except for sand and gravel;

2. Freeboard shall be no less than 0.3 feet. Protection shall be provided for transition of flows and for critical areas such as swales and curves. Where the area protected is a critical area as determined in the permit and plan, the design freeboard may be increased;

3. Energy dissipators shall be installed, when necessary, at discharge points, where diversions intersect with natural streams and exit velocity of the diversion ditch flow is greater than that of the receiving stream;

4. Excess excavated material not necessary for diversion channel geometry or regrading of the channel shall be disposed of in accordance with 10 CSR 40-3.220; and

5. Topsoil removed from the diversion excavations shall be handled in accordance with 10 CSR 40-3.190;

(G) Diversions shall not be constructed or operated to divert water into underground mines without the approval under section (14); and

(H) All diversions shall be designed to minimize adverse impacts to the hydrologic balance within the permit and adjacent areas, to prevent material damage outside the permit area and to assure the safety of the public.

(4) Stream Channel Diversions.

(A) Flow from perennial and intermittent streams within the permit area may be diverted if the diversions—

1. Are approved in the permit and plan if the requirements in subsection (16)(A) are found;

2. Comply with other requirements of this chapter and 10 CSR 40-4; and

3. Comply with local, state and federal statutes and regulations.

(B) When streamflow is allowed to be diverted, the stream channel diversion shall be designed, constructed and removed in accordance with the following:

1. The longitudinal profile of the stream, the channel and the floodplain shall be designed and constructed to remain stable and to prevent, to the extent possible using the best technology currently available, additional contributions of suspended solids to stream flow or to runoff outside the permit area. These contributions shall not be in excess of requirements of state or federal law. Erosion control structures such as channel-lining structures, retention basins and artificial channel roughness structures shall be used in diversions only when approved in the permit and plan as being necessary to control erosion. These structures shall be approved for permanent diversions only where they are stable and will require infrequent maintenance;

2. The combination of channel, bank and floodplain configurations shall be adequate to pass safely the peak runoff of a ten (10)-year, twenty-four (24)-hour precipitation event for temporary diversions, a one hundred (100)-year, twenty-four (24)-hour precipitation event for permanent diversions or larger events as specified in the permit and plan. However, the capacity of the channel itself should be at least equal to the capacity of the unmodified stream channel immediately upstream and downstream of the diversion; and

3. The design and construction of all stream channel diversions of perennial and intermittent streams shall be certified by a qualified registered professional engineer as meeting the performance standards of this

rule and any design criteria set by the director.

(C) When no longer needed to achieve the purpose for which they are authorized, all temporary stream channel diversions shall be removed and the affected land regraded and revegetated in accordance with 10 CSR 40-3.190(4) and (5), 10 CSR 40-3.260 and 10 CSR 40-3.270. At the time diversions are removed, downstream water treatment facilities previously protected by the diversion shall be modified or removed to prevent overtopping or failure of the facilities. This requirement shall not relieve the person who conducts the underground mining activities from maintenance of a water treatment facility otherwise required under this rule or the permit.

(D) When permanent diversions are constructed or stream channels restored after temporary diversions, the operator shall—

1. Restore, enhance where practicable or maintain natural riparian vegetation on the banks of the stream;

2. Establish or restore the stream to its natural meandering shape of an environmentally acceptable gradient as determined in the permit and plan; and

3. Establish or restore the stream to a longitudinal profile and cross-section, including aquatic habitats (usually a pattern of riffles, pools and drops rather than uniform depth) that approximate premining stream channel characteristics.

(5) Sediment Control Measures.

(A) Appropriate sediment control measures shall be designed, constructed and maintained using the best technology currently available to—

1. Prevent, to the extent possible, additional contributions of sediment to stream flow or to runoff outside the permit area;

2. Meet the more stringent or applicable state or federal effluent limitations; and

3. Minimize erosion to the extent possible.

(B) Sediment control measures include practices carried out within and adjacent to the disturbed area. The sedimentation storage capacity of practices in and downstream from the disturbed areas shall reflect the degree to which successful mining and reclamation techniques are applied to reduce erosion and control sediment. Sediment control measures consist of the utilization of proper mining and reclamation methods and sediment control practices, singly or in combination. Sediment control methods include, but are not limited to:

1. Disturbing the smallest practicable area at any one time during the mining oper-

ation through progressive backfilling, grading and prompt revegetation as required in 10 CSR 40-3.270(1)(B);

2. Stabilizing the backfilled material to promote a reduction of the rate and volume of runoff in accordance with the requirements of 10 CSR 40-3.260(1);

3. Retaining sediment within disturbed areas;

4. Diverting runoff away from disturbed areas;

5. Diverting runoff using protected channels or pipes through disturbed areas so as not to cause additional erosion;

6. Using straw dikes, riprap, check dams, mulches, vegetative sediment filters, dugout ponds and other measures that reduce overland flow velocity, reduce runoff volume or trap sediment;

7. Treating with chemicals; and

8. Treating mine drainage in underground sumps.

(6) Siltation structures.

(A) General Requirements. Siltation structures shall be used individually or in series and shall—

1. Be constructed before any disturbance of the undisturbed area to be drained into the pond and prior to any discharge of water to surface waters from underground mine workings;

2. Be located as near as possible to the disturbed area and out of perennial streams, unless approved in the permit and plan; and

3. Meet all criteria of this section.

(B) Sediment Storage Volume. Siltation structures shall provide adequate sediment storage volume.

(C) Detention Time. Siltation structures shall provide the required theoretical detention time for the water inflow or runoff entering the pond from a ten (10)-year, twenty-four (24)-hour precipitation event (design event), plus the average inflow from the underground mine.

(D) Dewatering. The water storage resulting from inflow shall be removed by a non-clogging dewatering device that has been designed, constructed and maintained in accordance with subsection (6)(C) of this rule or a conduit spillway approved in the permit and plan. The dewatering device shall not be located at a lower elevation than the maximum elevation of the sedimentation storage volume.

(E) Each person who conducts underground mining activities shall design, construct and maintain siltation structures to prevent short-circuiting to the extent possible.

(F) The design, construction and maintenance of a siltation structures or other sedi-

ment control measures in accordance with this section shall not relieve the person from compliance with applicable effluent limitations as contained in 10 CSR 40-3.040(2).

(G) There shall be no outflow through the emergency spillway during the passage of the runoff resulting from the ten (10)-year, twenty-four (24)-hour precipitation events and lesser events through the siltation structures, regardless of the volume of water and sediment present from the underground mine during the runoff.

(H) Siltation structures shall be designed, constructed and maintained to provide periodic sediment removal sufficient to maintain adequate volume for the design event.

(I) An appropriate combination of principal and emergency spillways shall be provided to discharge safely the runoff from a twenty-five (25)-year, twenty-four (24)-hour precipitation event or larger event required in the permit and plan, plus any inflow from the underground mine. The elevation of the crest of the emergency spillway shall be a minimum of one foot (1') above the crest of the principal spillway. Emergency spillway grades and allowable velocities shall be approved in the permit and plan.

(J) The minimum elevation of the top of the settled embankment shall be one foot (1') above the water surface in the reservoir with the emergency spillway flowing at design depth. For embankments subject to settlement, this one-foot (1') minimum elevation requirement shall apply at all times, including the period after settlement.

(K) The constructed height of the dam shall be increased a minimum of five percent (5%) over the design height to allow for settlement, unless it has been demonstrated in the permit and plan that the material used and the design will ensure against all settlement.

(L) The minimum top width of the embankment shall not be less than the quotient of

$$\frac{H + 35}{5}$$

where,

H in feet = the height of the embankment as measured from the upstream toe of the embankment.

(M) The combined upstream and downstream side slopes of the settled embankment shall not be less than 1v:5h, with neither slope steeper than 1v:2h. Slopes shall be designed to be stable in all cases, even if flatter side slopes are required.

(N) The embankment foundation area shall be cleared of all organic matter, all surfaces

sloped to no steeper than 1v:1h and the entire foundation surface scarified.

(O) The fill material shall be free of sod, large roots, other large vegetative matter and frozen soil and in no case shall coal processing waste be used.

(P) The placing and spreading of fill material shall be started at the lowest point of the foundation. The fill shall be brought up in horizontal layers of a thickness required to facilitate compaction and meet the design requirements of this section. Compaction shall be conducted as specified in the permit and plan.

(Q) If a siltation structure has an embankment that is more than twenty feet (20') in height, as measured from the upstream toe of the embankment to the crest of the open channel emergency spillway, unless the emergency spillway is a pipe, where it is measured to the lowest point in the top of the embankment or has both an embankment that is five feet (5') or more in height, as measured from the upstream toe of the embankment to the crest of the open channel emergency spillway and a storage volume of twenty (20) acre-feet or more above the upstream toe of the embankment, the following additional requirements shall be met:

1. An appropriate combination of principal and emergency spillways shall be provided to safely discharge the runoff resulting from a one hundred (100)-year, twenty-four (24)-hour precipitation event or a larger event specified in the permit and plan, plus any inflow from the underground mine;

2. The embankment shall be designed and constructed with an acceptable static safety factor of at least one and five-tenths (1.5), or a higher safety factor as designated in the permit and plan to ensure stability;

3. Appropriate barriers shall be provided to control seepage along conduits that extend through the embankments; and

4. The criteria of the Mine Safety and Health Administration (MSHA) as published in 30 CFR 77.216 shall be met.

(R) Each pond shall be designed and inspected during construction under the supervision of and certified after construction by a registered professional engineer.

(S) The entire embankment, including the surrounding areas disturbed by construction, shall be stabilized with respect to erosion by a vegetative cover or other means immediately after the embankment is completed. The active upstream face of the embankment where water is being impounded may be riprapped or otherwise stabilized. Areas in which the vegetation is not successful or where rills and gullies develop shall be

repaired and revegetated in accordance with 10 CSR 40-3.260(4).

(T) Impoundments meeting the Class B or C criteria for dams in the U.S. Department of Agriculture, Soil Conservation Service (now renamed as the Natural Resource Conservation Service) Technical Release No. 60 (210-VI, TR-60, Revised Oct. 1985), entitled "Earth Dams and Reservoirs," hereafter in these rules referred to as TR-60, or the size or other criteria of 30 CFR 77.216 must be examined in accordance with 30 CFR 77.216-3. The technical release referred to as TR-60 is incorporated by reference. Impoundments which do not meet the above criteria shall be examined at least quarterly by a qualified person designated by the operator for the appearance of structural weakness and other hazardous conditions.

(U) Siltation structure shall not be removed until removal is authorized and until the disturbed area has been restored and the vegetation requirements of 10 CSR 40-3.270 are met and the drainage entering the pond has met the applicable state and federal water quality requirements for the receiving stream. In no case shall the structure be removed sooner than two (2) years after the last augmented seeding. When the siltation structures are removed, the affected land shall be regraded and revegetated in accordance with 10 CSR 40-3.260 and 10 CSR 40-3.270, unless the pond has been approved in the permit and plan for retention as being compatible with the approved postmining land use under 10 CSR 40-3.300. If retention is approved in the permit and plan, the siltation structures shall meet all the requirements for permanent impoundments of sections (10) and (16) of this rule.

(7) Other Treatment Facilities.

(A) Other treatment facilities shall be designed to treat the ten (10)-year, twenty-four (24)-hour precipitation event unless a lesser design event is approved by the director based on terrain, climate, other site-specific conditions and a demonstration by the operator that the effluent limitations of section (2) will be met.

(B) Other treatment facilities shall be designed in accordance with the applicable requirements of section (6) of this rule.

(8) Discharge Structures. Discharge from siltation structures, permanent impoundments, coal processing waste dams and embankments and diversions shall be controlled by energy dissipators, riprap channels and other devices, where necessary, to reduce erosion, to prevent deepening or enlargement of stream channels and to minimize disturbance

of the hydrologic balance. Discharge structures shall be designed according to standard engineering design procedures.

(9) Acid- and Toxic-Forming Materials. Drainage from acid- and toxic-forming underground development waste and spoil, if any, into ground and surface water shall be avoided by—

(A) Identifying, burying and treating, where necessary, waste and spoil which may be detrimental to vegetation or may adversely affect water quality, if not treated or buried;

(B) Preventing water from coming into contact with acid- and toxic-forming materials in accordance with section 10 CSR 40-3.260(3) and other measures required in the permit and plan; and

(C) Burying or otherwise treating all acid- or toxic-forming underground development waste and spoil within thirty (30) days after they are first exposed on the mine site or within a lesser period required in the permit and plan. Temporary storage of these materials may be approved in the permit and plan upon a finding that burial or treatment within thirty (30) days is not feasible and will not result in any material risk of water pollution or other environmental damage. Storage shall be limited to the period until burial or treatment first becomes feasible. Acid- and toxic-forming underground development waste and spoil to be stored shall be placed on impermeable material and protected from erosion and contact with surface water.

(10) Permanent and Temporary Impoundments.

(A) Impoundments meeting the criteria of 30 CFR 77.216(a) shall comply with the requirements of 30 CFR 77.216 and this section. The plan required to be submitted to the district manager of the MSHA under 30 CFR 77.216 shall also be submitted to the regulatory authority as part of the permit application. Furthermore, impoundments meeting the Class B or C criteria for dams in TR-60 shall comply with the "Minimum Emergency Spillway Hydrologic Criteria" table in TR-60 and the requirements of this section.

(B) Permanent impoundments are prohibited, unless authorized in the permit and plan, upon the basis of the following demonstration:

1. The quality of the impounded water shall be suitable, on a permanent basis, for its intended use and discharge of water from the impoundment shall not degrade the quality of receiving waters to less than the water quality standards established pursuant to applicable state and federal laws;

2. The level of water shall be sufficiently stable to support the intended use;

3. Adequate safety and access to the impounded water shall be provided for proposed water users;

4. Water impoundments will not result in the diminution of the quality or quantity of water used by adjacent or surrounding landowners for agricultural, industrial, recreational or domestic uses;

5. The design, construction and maintenance of structures shall achieve the minimum design requirements applicable to structures constructed and maintained under the Watershed Protection and Flood Prevention Act, P. L. 83-566 (16 U.S.C. 1006). Requirements for impoundments that meet the size or other criteria of the MSHA, 30 CFR 77.216(a) are contained in United States Soil Conservation Service Technical Release No. 60, *Earth Dams and Reservoirs*, June 1976. Requirements for impoundments that do not meet the size or other criteria contained in 30 CFR 77.216(a) are contained in United States Natural Resources Conservation Service, Conservation Practice Standards, POND, No. CODE 378, December, 1998. The technical release and practice standards are incorporated by reference as they exist on the date of adoption of this chapter;

6. The size of the impoundment is adequate for its intended purposes; and

7. The impoundment will be suitable for the approved postmining land use.

(C) Temporary impoundments of water in which the water is impounded in a dam shall meet the requirements of subsections (6)(E)—(U) of this rule.

(D) Excavations that will impound water during or after the mining operation shall have perimeter slopes that are stable and shall not be steeper than 1v:2h. Where surface runoff enters the impoundment area, the side slope shall be protected against erosion.

(E) Slope protection shall be provided to minimize surface erosion at the site and protect against sudden drawdown. Sediment control measures shall be required, where necessary, to reduce the sediment leaving the site.

(F) All embankments of temporary and permanent impoundments and the surrounding areas and diversion ditches disturbed or created by construction shall be graded, fertilized, seeded and mulched to comply with the requirements of 10 CSR 40-3.270 immediately after the embankment is completed, provided that the active upstream face of the embankment where water will be impounded may be riprapped or otherwise stabilized. Areas in which the vegetation is not successful or where rills and gullies develop shall be repaired and revegetated to comply with the

requirements of 10 CSR 40-3.260(4) and 10 CSR 40-3.270.

(G) All dams and embankments shall be routinely inspected by a qualified registered professional engineer or by someone under the supervision of a qualified registered professional engineer. The professional engineer or specialist shall be experienced in the construction of impoundments. Inspections shall be made regularly during construction, upon completion of construction and at least yearly until removal of the structure or release of the performance bond.

(H) All dams and embankments shall be routinely maintained during the mining operations. Vegetative growth shall be cut where necessary to facilitate inspection and repairs. Ditches and spillways shall be cleaned. Any combustible materials present on the surface, other than material such as mulch or dry vegetation used for surface stability, shall be removed and all other appropriate maintenance procedures followed.

(I) All dams and embankments shall be certified by a qualified registered professional engineer during construction, immediately after construction and annually after that, as having been constructed maintained to comply with the requirements of 10 CSR 40. All coal processing waste dams and embankments covered by 10 CSR 40-3.230(9)–(11) shall be certified by a qualified registered professional engineer. Certification reports shall be provided certifying that the impoundment has been constructed and maintained as designed and in accordance with the approved plan and this chapter, shall include a discussion on any appearance of instability, structural weakness or other hazardous condition and shall include statements on:

1. Existing and required monitoring procedures and instrumentation;
2. The design depth and elevation of any impounded waters at the time of the initial certification report or the average and maximum depths and elevations of any impounded waters over the past year for the annual certification reports;
3. Existing storage capacity of the dam or embankment;
4. Any fires occurring in the construction material up to the date of the initial certification or over the past year for the annual certification reports; and
5. Any other aspects of the dam or embankment affecting stability, including structural weakness, erosion and other hazardous conditions.

(J) Plans for any enlargement, reduction in size, reconstruction or other modification of dams or impoundments shall be submitted to the director and shall comply with the

requirements of this section. Except where a modification is required to eliminate an emergency condition constituting a hazard to public health, safety or the environment, the plans will be approved before modification begins.

(K) If any examination or inspection discloses that a potential hazard exists, the person who examined the impoundment shall promptly inform the director of the finding and of the emergency procedures formulated for public protection and remedial action. If adequate procedures cannot be formulated or implemented, the director shall be notified immediately. The director shall then notify the appropriate agencies that other emergency procedures are required to protect the public.

(L) Stability.

1. An impoundment meeting the Class B or C criteria for dams in TR-60, or the size or other criteria of 30 CFR 77.216(a) shall have a minimum static safety factor of 1.5 for a normal pool with steady state seepage saturation conditions, and a seismic safety factor of at least 1.2.

2. Impoundments not included in paragraph 10 CSR 40-3.200(10)(L)1. of this section, except for a coal mine waste impounding structure, shall have a minimum static safety factor of 1.3 for a normal pool with steady state seepage saturation conditions or meet the requirements of United States Natural Resources Conservation Service, Conservation Practice Standard, POND, No. CODE 378, December, 1998, and be less than twenty feet (20') in height.

(M) Freeboard. Impoundments shall have adequate freeboard to resist overtopping by waves and by sudden increases in storage volume. Impoundments meeting the Class B or C criteria for dams in TR-60 shall comply with the freeboard hydrograph criteria in the "Minimum Emergency Spillway Hydrologic Criteria" table in TR-60.

(N) Foundation.

1. Foundations and abutments for an impounding structure shall be stable during all phases of construction and operation and shall be designed based on adequate and accurate information on the foundation conditions. For an impoundment meeting the Class B or C criteria for dams in TR-60, or the size or other criteria of 30 CFR 77.216(a), foundation investigation, as well as any necessary laboratory testing of foundation material, shall be performed to determine the design requirements for foundation stability.

2. All vegetative and organic materials shall be removed and foundations excavated and prepared to resist failure. Cutoff trenches shall be installed if necessary to ensure stability.

(O) Spillways. An impoundment shall have either a combination of principal and emergency spillways, a single spillway configured as specified in 10 CSR 40-3.200(10)(O)1. of this section, or no spillways as specified in 10 CSR 40-3.200(10)(O)3. of this section. The impoundment shall be designed and constructed to safely pass or contain the applicable design precipitation event specified in 10 CSR 40-3.200(10)(O)2. or 3. of this section.

1. A single open-channel spillway can be utilized if it is:

A. Of nonerodible construction and designed to carry sustained flows; or

B. Earth- or grass-lined and designed to carry short-term, infrequent flows at nonerosive velocities where sustained flows are not expected.

2. Except as specified in 10 CSR 40-3.200(10)(O)3. of this section, the required design precipitation event for an impoundment meeting the spillway requirements of 10 CSR 40-3.200(10)(O) of this section is:

A. For an impoundment meeting the Class B or C criteria for dams in TR-60, the emergency spillway hydrograph criteria in the "Minimum Emergency Spillway Hydrologic Criteria" table in TR-60.

B. For an impoundment meeting or exceeding the size or other criteria of 30 CFR 77.216(a), a one hundred (100)-year twenty-four (24)-hour event.

C. For an impoundment not included in 10 CSR 40-3.200(10)(O)2. A. and B. of this section, as specified in Table 3 of the United States Natural Resources Conservation Service, Conservation Practice Standard, POND, No. CODE 378, December, 1998.

3. A temporary impoundment that relies solely on storage capacity to control the runoff from the design precipitation event may be utilized with no spillway when it is demonstrated by the operator and certified by a qualified registered professional engineer that the impoundment will safely contain the design precipitation event, and that the stored water will be safely removed in accordance with current, prudent, engineering practices. Such an impoundment must be located where failure would not be expected to cause loss of life or serious property damage.

A. Impoundments meeting the Class B or C criteria for dams in TR-60, or the size or other criteria of 30 CFR 77.216(a) shall be designed to safely contain the runoff of the probable maximum precipitation (PMP) of a six (6)-hour event.

B. Impoundments not included in subparagraph 10 CSR 40-3.200(10)(O)3.A. of this section shall be designed to control the precipitation of the one hundred (100)-year twenty-four (24)-hour event.

C. For an impoundment not included in 10 CSR 40-3.200(10)(O)2. A. and B. of this section, as specified in Table 3 of the United States Natural Resources Conservation Service, Conservation Practice Standard, POND, No. CODE 378, December, 1998.

(11) Underground Mine Entry and Access Discharges.

(A) Surface entries and accesses to underground workings, including adits and slopes, shall be located, designed, constructed and utilized to prevent or control gravity discharge of water from the mine.

(B) Gravity discharge of water from an underground mine, other than a drift mine subject to subsection (11)(C), may be allowed in the permit and plan if it is demonstrated that—

1. The discharge, without treatment, satisfies the water effluent limitations of section (2) of this rule and all applicable state and federal water quality standards and that discharge will result in changes in the prevailing hydrologic balance that are minimal and approved postmining land uses will not be adversely affected; or

2. The discharge is conveyed to a treatment facility in the permit area in accordance with subsection (2)(A) of this rule, all water from the underground mine discharged from the treatment facility meets the effluent limitations of section (2) of this rule and all other applicable state and federal statutes and regulations and consistent maintenance of the treatment facility will occur throughout the anticipated period of gravity discharge.

(C) Notwithstanding anything to the contrary in subsections (11)(A) and (B), for a drift mine first used after the implementation of the regulatory program and located in acid- or iron-producing coal seams, surface entries and accesses shall be located in a manner so as to prevent any gravity discharge from the mine.

(12) Surface Water and Groundwater Monitoring.

(A) Groundwater.

1. Groundwater levels, infiltration rates, subsurface flow and storage characteristics and the quality of groundwater shall be monitored in a manner approved in the permit and plan to determine the effects of underground mining activities on the recharge capacity of reclaimed lands and on the quantity and quality of water in groundwater systems in the mine plan and adjacent areas.

A. Groundwater monitoring data shall be submitted every three (3) months to the director or more frequently as prescribed by the director. Monitoring reports shall include

analytical results from each sample taken during the reporting period. When the analysis of any groundwater sample indicates non-compliance with the permit conditions, the operator shall promptly notify the director and take remedial measures provided for in 10 CSR 40-6.050(9) and 10 CSR 40-6.070(14).

B. Groundwater monitoring shall proceed through mining and continue during reclamation until bond release. Consistent with the procedures of 10 CSR 40-6.090, the director may modify the monitoring requirements, including the parameters covered and the sampling frequency, if the operator demonstrates, using the monitoring data obtained under this paragraph, that—

(I) The operation has minimized disturbance to the hydrologic balance in the permit and adjacent areas and prevented material damage to the hydrologic balance outside the permit area; water quantity and quality are suitable to support approved postmining land uses; and the water rights of other users have been protected or replaced; or

(II) Monitoring is no longer necessary to achieve the purposes set forth in the monitoring plan approved under 10 CSR 40-6.120(5)(C).

2. When underground mining activities may affect groundwater systems which serve as aquifers which significantly ensure the hydrologic balance of water use either on or off the mine plan area, ground levels and groundwater quality shall be periodically monitored. Monitoring shall include measurements from a sufficient number of wells and mineralogical and chemical analyses of aquifer, overburden and spoil that are adequate to reflect changes in groundwater quantity and quality resulting from those activities. Monitoring shall be adequate to plan for modification of the underground mining activities if necessary to minimize disturbance of the prevailing hydrologic balance.

3. As specified in the permit and plan, the person who conducts the underground mining activities shall conduct additional hydrologic tests, including drilling, infiltration tests and aquifer tests and the results shall be submitted to the director to demonstrate compliance with sections (11) and (12) of this rule.

(B) Surface Water.

1. Surface water monitoring shall be conducted in accordance with the monitoring program submitted under 10 CSR 40-6.120(5)(C)3. and approved in the permit and plan. The permit and plan shall set forth the nature of data, frequency of collection and reporting requirements.

A. Monitoring shall be adequate to measure accurately and record water quantity and quality of discharges from the permit area;

B. In all cases in which analytical results of the sample collections indicate non-compliance with a permit condition or applicable standard has occurred, result in the person who conducts underground mining activities notifying the director within five (5) days. Where a National Pollutant Discharge Elimination System (NPDES) permit effluent limitation noncompliance has occurred, the person who conducts the underground mining activities shall forward the analytic results concurrently with the written notice of non-compliance; and

C. Monitoring shall result in quarterly reports to the director to include analytical results from each sample taken during the quarter. Any sample results which indicate a permit violation will be reported immediately to the director provided for in 10 CSR 40-6.050(9) and 10 CSR 40-6.120(5). In those cases where the discharge for which water monitoring reports are required is also subject to regulation by an NPDES permit issued under the Clean Water Act of 1977 (30 U.S.C. sections 1251-1378) and where the permit includes provisions for equivalent reporting requirements and requires filing of the water monitoring reports within ninety (90) days or less of sample collection, the following alternative procedure shall be used. The person who conducts the underground mining activities shall submit to the director on the same time schedule as required by the NPDES permit, or within ninety (90) days following sample collection, whichever is earlier, either—

(I) A copy of the completed reporting form filed to meet the NPDES permit requirement; or

(II) A letter identifying the state or federal government official with whom the reporting form was filed to meet the NPDES permit requirements and the date of filing.

2. Surface water flow and quality, including discharges to surface waters from the permit area and receiving waters shall continue to be monitored after both the cessation of use of underground mine workings and after surface disturbed areas have been regraded and stabilized according to this chapter. Data from this monitoring may be used to demonstrate that the quality and quantity of runoff without treatment is consistent with the requirement of this chapter to minimize disturbance to the prevailing hydrologic balance and to attain the approved postmining land use. These data may also provide a basis for approval by the commission or

director for removal of water quality or flow control systems.

3. Equipment, structures and other devices necessary to measure and sample accurately the quality and quantity of surface water discharges from the surface disturbed area and from underground mine workings shall be properly installed, maintained and operated and shall be removed when no longer required.

(13) Transfer of Wells.

(A) An exploratory or monitoring well may only be transferred by the person who conducts underground mining activities for further use as a water well with the prior approval of the commission or director. That person and the surface owner of the lands where the well is located shall jointly submit a written request to the director for that approval.

(B) Upon an approved transfer of a well, the transferee shall—

1. Assume primary liability for damages to persons or property from the well;

2. Plug the well when necessary, but in no case later than abandonment of the well; and

3. Assume primary responsibility for compliance with 10 CSR 40-3.180 and those of the Wellhead Protection Section, Division of Geology and Land Survey, at 10 CSR 23, Chapter 3 with respect to the well.

(C) Upon an approved transfer of a well, the transferor shall be secondarily liable for the transferee's obligations under subsection (13)(B), until release of the bond or other equivalent guarantee required by 10 CSR 40-7 for the area in which the well is located.

(14) Water Rights and Replacement. Any person who conducts underground mining activities shall replace the water supply of an owner of interest in real property who obtains all or part of his/her supply of water for domestic, agricultural, industrial or other legitimate use from an underground or surface source, where the water supply has been affected by contamination, diminution or interruption proximately resulting from the underground mining activities.

(15) Discharge of Water Into an Underground Mine. Water from the surface or from an underground mine shall not be diverted or discharged into other underground mine workings, unless allowed by section 577.155, RSMo, and the person who conducts the underground mining activities demonstrates in the permit and plan application that the discharge will—

(A) Abate water pollution or otherwise eliminate public hazards resulting from underground mining activities;

(B) Be discharged as a controlled flow;

(C) Meet the effluent limitations of section (2) of this rule for pH and total suspended solids except that the pH and total suspended solids limitations may be exceeded, if approved in the permit and plan and the discharge is limited to—

1. Coal processing waste;

2. Underground mine development waste;

3. Fly ash from a coal-fired facility;

4. Sludge from an acid-mine drainage treatment facility;

5. Flue gas desulfurization sludge; or

6. Inert materials used for stabilizing underground mines;

(D) Continue as a controlled and identifiable flow and is ultimately treated by an existing treatment facility;

(E) From underground mines to surface waters, not cause, result in or contribute to a violation of applicable surface water quality standards or effluent limitations;

(F) Minimize disturbance to the hydrologic balance; and

(G) Meet with the approval of the MSHA.

(16) Postmining Rehabilitation of Siltation Structures, Diversions, Impoundments and Treatment Facilities. Before abandoning the permit area, the person who conducts the underground mining activities shall renovate all permanent siltation structures, diversions, impoundments and treatment facilities to meet criteria specified in the detailed design plan for the permanent structures and impoundments.

(17) Stream Buffer Zones.

(A) No land within one hundred feet (100') of a perennial stream or an intermittent stream shall be disturbed by underground mining activities, unless the director specifically authorizes underground mining activities closer to, or through, the stream. The director may authorize mining activities only upon finding that—

1. Underground mining activities will not cause or contribute suspended solids in stream flow or runoff outside the permit area in excess of the requirements established by the Missouri Clean Water Commission, Department of Natural Resources, set forth in 10 CSR 20-7.015;

2. Underground mining activities will not adversely affect the water quantity and quality or other environmental resources of the stream; and

3. It will comply with section (4) if there will be a temporary or permanent stream channel diversion.

(B) The area not to be disturbed shall be designated as a buffer zone, and the operator shall mark it as specified in 10 CSR 40-3.070(5).

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**Original authority: 444.810, RSMo 1979, amended 1983, 1993, 1995.*

10 CSR 40-3.210 Requirements for the Use of Explosives for Underground Operations

PURPOSE: This rule brings the Land Reclamation Program into line with the Office of Surface Mining Reclamation and Enforcement rule changes on the same subject.

(1) General Requirements.

(A) Sections (1)—(5) apply to surface blasting activities incident to underground coal mining, including, but not limited to, initial rounds of slopes and shafts.

(B) Each operator shall comply with all applicable state and federal laws and regulations in the use of explosives.

(C) Blasters.

1. Prior to the approval by the federal office of Surface Mining of a blaster certification program designated to regulate and document the quality of persons responsible for the removal of coal overburden by means of explosives in Missouri, all these operations shall be conducted by experienced, trained and competent persons who understand the hazards involved. By July 1, 1989, all blasting operations in Missouri shall be conducted under the direction of a certified blaster.

2. A blaster and at least one (1) other person shall be present at the firing of a blast.

3. Any person responsible for conducting blasting operations at a blasting site shall—

A. Be familiar with the blasting plan and site-specific performance standards; and

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

(D) Blast Design.

1. An anticipated blast design shall be submitted if blasting operations will be conducted within—

A. One thousand feet (1000') of any building used as a dwelling, public building, school, church, or community or institutional building, including those listed in 10 CSR 40-3.050(5)(D)1.; or

B. Five hundred feet (500') of active or abandoned underground mines.

2. The blast design may be presented either as part of a permit application or thirty (30) days before the initiation of blasting, approved by the director or commission.

3. The blast design shall contain sketches of the drill patterns, delay periods and decking and shall indicate the type and amount of explosives to be used, critical dimensions and the location and general description of structures to be protected, as well as a discussion of design factors to be used, which protect the public and meet the applicable airblast, flyrock and ground vibration standards in section (5) of this rule.

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

5. The director or commission may require changes to the design submitted.

(2) Use of Explosives: Preblasting Survey.

(A) At least forty (40) days before initiation of blasting, the operator shall ensure that all residents or owners of public buildings, schools, churches, community or institutional buildings, dwellings or other structures, including those listed in 10 CSR 40-3.050(5)(D)1., located within one-half (1/2) mile of the permit area are notified by certified letter how to request a preblast survey.

(B) A resident or owner of a dwelling or structure within one-half (1/2) mile of any part of the permit area may request a preblasting survey. This request shall be made, in writing, directly to the operator or to the director or commission who promptly shall notify the operator. The operator shall ensure that a prompt preblast survey of the dwelling or structure will be conducted and that a written report of the survey is promptly prepared. The operator shall ensure that an updated survey of any additions, modifications or renovations shall be performed if requested by the resident or owner.

(C) The operator shall ensure that the condition of the dwelling or structure be determined and that any preblasting damage and other physical factors that could reasonably

be affected by the blasting be documented. Structures such as pipelines, cables, transmission lines and cisterns, wells and other water systems warrant special attention; however, the assessment of these structures may be limited to surface conditions and other readily available data.

(D) The written report of the survey shall be signed by the person who conducted the survey. Copies of the report shall be promptly provided to the director or commission and to the person requesting the survey. If the person requesting the survey disagrees with its contents, recommendations, or both, s/he may submit to both the operator and the director or commission a detailed description of the specific areas of disagreement within forty-five (45) days of receipt of the survey.

(E) The operator shall ensure that any surveys requested more than ten (10) days before the planned initiation of blasting shall be completed before the initiation of blasting.

(F) The operator shall ensure that the director or commission is provided a list of all people outlined in 10 CSR 40-3.050(2)(A), including their addresses. The list shall distinguish between persons who have agreed to a preblast survey and those who have refused a survey.

(G) The operator shall ensure that the property owner be made aware that the preblast survey will be made at no cost to the property owner.

(3) Use of Explosives: General Performance Standards.

(A) The operator shall ensure, in writing, that residents within one-half (1/2) mile of the blasting site and local city and county governments are notified of the proposed times and locations of blasting operations. The notice of times that blasting is to be conducted may be announced weekly, but in no case less than twenty-four (24) hours before blasting will occur.

(B) Unscheduled blasts may be conducted only where public or operator health and safety so require and for emergency blasting actions. When an operator conducts an unscheduled surface blast incidental to underground coal mining operations, the operator, using audible signals, shall notify residents within one-half (1/2) mile of the blasting site and document the reason in accordance with subsection (6)(P) of this rule.

(C) All blasting shall be conducted between sunrise and sunset, unless nighttime blasting is approved by the director or commission based upon a showing by the operator that the public will be protected from

adverse noise and other impacts. The director or commission may specify more restrictive time periods for blasting.

(4) Use of Explosives: Blasting Signs, Warnings and Access Control.

(A) Blasting Signs. Blasting signs shall meet the specifications of 10 CSR 40-3.170(1). The operator shall—

1. Place conspicuously signs reading “Blasting Area” along the edge of any blasting area that comes within one hundred feet (100') of any public road right-of-way and at the point where any other road provides access to the blasting area; and

2. Place conspicuous signs at all entrances to the permit area from public roads or highways, which state Warning! Explosives in Use, which clearly list and describe the meaning of the audible blast warning and all-clear signals that are in use and which explain the marking of blasting areas, and loaded or charged holes awaiting firing within the permit area.

(B) Warnings. Warning and all-clear signals of different character or pattern that are audible within a range of one-half (1/2) mile from the point of the blast shall be given. Each person within the permit area and each person who resides or regularly works within one-half (1/2) mile of the permit area shall be notified of the meaning of the signals in the blasting notification required in subsection (3)(A) of this rule.

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

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

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

(5) Use of Explosives: Control of Adverse Effects.

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

(B) Airblast.

1. Limits.

A. Airblast shall not exceed the maximum limits listed in figure 1 at the location of any dwelling, public building, school, church or community or institutional building



outside the permit area, except as provided in subsection (5)(E) of this rule:

Figure 1—Maximum Airblast Levels

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

*Only when approved by the commission or director.

B. If necessary to prevent damage, the director or commission may specify lower maximum allowable airblast levels than those of subparagraph (5)(B)1.A. of this rule for use in the vicinity of a specific blasting operation.

2. Monitoring.

A. The operator shall ensure that one (1) blast every twelve (12) months is monitored at the nearest uncontrolled structure to ensure compliance with the airblast standards. The record, as per section (6) of this rule, of this monitored event shall be submitted to the director no later than January 31 of each year for that year being monitored. The director or commission may require airblast measurement of any or all blasts and may specify the locations at which these measurements are taken.

B. Each airblast monitoring report shall be for each active permit.

C. The measuring systems shall have an upper end flat frequency response of at least two hundred hertz (200 Hz).

(C) Flyrock. Flyrock traveling in the air or along the ground shall not be cast from the blasting site—

1. Either more than one-half (1/2) the distance to the nearest dwelling or other occupied structure or beyond the permit boundary, whichever is greater; or

2. Beyond the area of control required under subsection (4)(C).

(D) Ground Vibration.

1. General. In all blasting operations, except as otherwise authorized in subsection (5)(E) of this rule, the maximum ground vibration shall not exceed the values approved by the commission. The maximum ground vibration for protected structures listed in subparagraph (5)(D)2.A. of this rule shall be established in accordance with either the maximum peak particle velocity limits of paragraph (5)(D)2., the scaled distance equation of paragraph (5)(D)3., the blasting level chart of paragraph (5)(D)4. of this rule or by the commission or director under para-

graph (5)(D)5. of this rule. All structures in the vicinity of the blasting area, not listed in subparagraph (5)(D)2.A. of this rule, such as water towers, pipelines and other utilities, tunnels, dams, impoundments and underground mines, shall be protected from damage by establishment of a maximum allowable limit on the ground vibration, submitted by the operator and approved by the commission or director before initiation of blasting.

2. Maximum peak particle velocity.

A. The maximum ground vibration shall not exceed the limits listed in Figure 2 at the location of any dwelling, public building, school, church, community, institutional building outside the permit area:

Figure 2—Maximum Ground Vibration Levels

in Distance (D) from the blasting site in feet	Maximum allowable peak particle velocity (V max) for ground vibration in inches/second*	Scaled-distance factor to be applied without seismic monitoring** (DS)
0—300	1.25	50
301—5000	1.00	55
5001 and beyond	0.75	65

*Ground vibration shall be measured as the particle velocity. Particle velocity shall be recorded in three (3) mutually perpendicular directions. The maximum allowable peak particle velocity shall apply to each of the three (3) measurements.

**Applicable to the scaled distance equation of subparagraph (5)(D)3.A. of this rule.

B. A seismographic record shall be provided for each blast.

3. Scaled distance equation.

A. An operator may use the scaled distance equation, $W=(D/Ds)^2$, to determine the allowable charge weight of explosives to be detonated in any eight (8) millisecond period, without seismic monitoring where,

W=the maximum weight of explosives, in pounds;

D=the distance, in feet, from the blasting site to the nearest protected structure; and

Ds=the scaled distance factor, which may initially be approved by the commission using the values for scaled distance factor listed in subparagraph (5)(D)2.A. of this rule.

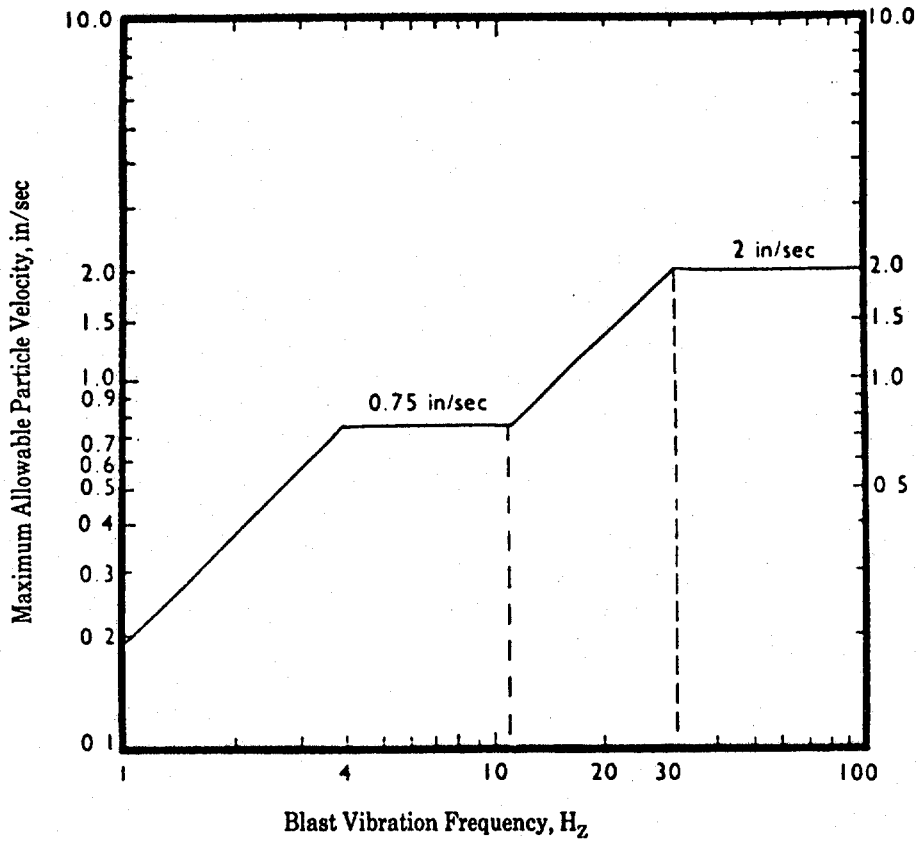
B. The development of a modified scaled distance factor may be authorized by the director or commission on receipt of a written request by the operator, supported by

seismographic records of blasting at the mine site. The modified scale distance factor shall be determined such that the particle velocity of the predicted ground vibration will not exceed the prescribed maximum allowable peak particle velocity of subparagraph (5)(D)2.A. of this rule, at a ninety-five percent (95%) confidence level.

4. Blasting level chart.

A. An operator may use the ground vibration limits in Figure 3 to determine the maximum allowable ground vibration.

B. If the Figure 3 limits are used, a seismographic record, including both particle velocity and vibration frequency levels, shall be provided for each blast. The method for the analysis of the predominant frequency contained in the blasting records shall be approved by the director or commission before application of this alternative blasting criterion.



5. The maximum allowable ground vibration shall be reduced by the director or commission beyond the limits otherwise provided by this section, if determined necessary to provide damage protection.

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

(E) The maximum air blast and ground vibration standards of subsections (5)(B) and (D) of this rule shall not apply at the following locations:

1. At structures owned by the permittee and not leased to another person; and
2. At structures owned by the permittee and leased to another person, if a written waiver by the lessee is submitted to the director before blasting.

(6) Use of Explosives: Records of Blasting Operations. The operator shall retain a record of all blasts for at least three (3) years. Upon request, copies of these records shall be made available to the director or commission and to the public for inspection. These records shall contain the following data:

- (A) Name of the operator conducting the blast;
- (B) Location, date and time of the blast;
- (C) Name, certification number and signature of the blaster in charge conducting the blast;
- (D) Identification, direction and distance, in feet, from the nearest blast hole to the nearest dwelling, public building, school, church, community or institutional building outside the permit area or those outlined in 10 CSR 40-3.050(5)(D)1., except those described in subsection (5)(E);
- (E) Weather conditions, including those which may cause possible adverse blasting effects;
- (F) Type of material blasted;
- (G) Sketches of the blast pattern including number of holes, burden, spacing, decks and delay pattern;
- (H) Diameter and depth of holes;
- (I) Type of explosives used;
- (J) Total weight of explosives used per hole;
- (K) The maximum weight of explosives detonated in an eight (8)-millisecond period;
- (L) Initiation system;
- (M) Type and length of stemming;
- (N) Mats or other protections used;
- (O) Seismographic and airblast records, if required, which shall include:

1. Type of instrument, sensitivity and calibration signal or certification of annual calibration;

2. Exact location of instrument and the date, time and distance from the blast;

3. Name of the person and firm taking the reading;

4. Name of the person and firm analyzing the seismographic record; and

5. The vibration, air blast level, or both, recorded; and

(P) Reasons and conditions for each unscheduled blast.

*AUTHORITY: section 444.810, RSMo 1994. * Original rule filed Aug. 8, 1980, effective Dec. 11, 1980. Rescinded and readopted: Filed Jan. 5, 1987, effective July 1, 1987. Amended: Filed July 1, 1987, effective Sept. 25, 1987. Amended: Filed June 2, 1988, effective Aug. 25, 1988. Amended: Filed July 3, 1990, effective Nov. 30, 1990.*

**Original authority 1979, amended 1983, 1993.*

10 CSR 40-3.220 Disposal of Underground Development Waste and Excess Spoil

PURPOSE: This rule sets forth the requirements for the disposal of underground development waste and excess spoil pursuant to sections 444.810, 444.855.2(15) and 444.860.2(4), RSMo.

(1) General Requirements.

(A) Underground development waste and spoil not required to achieve the approximate original contour and which is not used as backfill shall be hauled or conveyed to and placed in designated disposal areas within a permit area, within a time approved by the director in the permit and plan, if the disposal areas are authorized for those purposes in the permit and plan in accordance with sections (1)—(4) of this rule. The material shall be placed in a controlled manner to ensure that—

1. Leachate and surface runoff from the fill will not degrade surface or ground waters or exceed the effluent limitations of 10 CSR 40-3.200(2);
2. The fill is stable; and
3. The land mass designated as the disposal area is suitable for reclamation and revegetation compatible with the natural surroundings.

(B) The fill and appurtenant structures shall be designed using recognized professional standards, certified by a registered professional engineer experienced in the design of earth and rock fills and approved in the permit and plan.

(C) All vegetative and organic materials shall be removed from the disposal area and the topsoil shall be removed, segregated and stored or replaced in accordance with 10 CSR 40-3.190. If approved in the permit and plan, organic material may be used as mulch or may be included in the topsoil to control erosion, promote growth of vegetation or increase the moisture retention of the soil.

(D) Slope protection shall be provided to minimize surface erosion at the site. Diversion design shall conform with the requirements of 10 CSR 40-3.040(3). All disturbed areas, including diversion ditches that are not ripped, shall be vegetated upon completion of construction.

(E) The disposal areas shall be located on the most moderately sloping and naturally stable areas available as approved in the permit and plan. If the placement provides additional stability and prevents mass movement, fill materials suitable for disposal shall be placed upon or above a natural terrace, bench or berm.

(F) The fill materials shall be hauled or conveyed and placed in horizontal lifts in a controlled manner not exceeding four feet (4') in thickness; concurrently compacted as necessary to ensure mass stability and prevent mass movement, covered and graded to allow surface and subsurface drainage to be compatible with the natural surroundings and ensure a long-term static safety factor of one and five tenths (1.5). The commission or director may approve a design which incorporates placement of excess spoil in horizontal lifts other than four feet (4') in thickness when it is demonstrated by the operator and certified by a qualified registered professional engineer that the design will ensure the stability of the fill and will meet all other applicable requirements.

(G) The final configuration of the fill must be suitable for postmining land uses approved in accordance with 10 CSR 40-3.300, except that no depressions or impoundments shall be allowed on the completed fill.

(H) Excess spoil that is acid- or toxic-forming or combustible and shall be adequately covered with nonacid, nontoxic and noncombustible material, or treated to control the impact on surface and ground water, in accordance with 10 CSR 40-3.200, to prevent sustained combustion and to minimize adverse effects on plant growth and the approved postmining land use.

(I) Terraces may be utilized to control erosion and enhance stability if approved in the permit and plan and consistent with 10 CSR 40-3.260(2)(B).

(J) Where the slope in the disposal area exceeds 1v:2.8h (36%), or a lesser slope as

may be designated in the permit and plan based on local conditions, keyway cuts (excavations to stable bedrock) or rock toe buttresses shall be constructed to stabilize the fill. Where the toe of the spoil rests on a downslope, stability analyses shall be performed in accordance with 10 CSR 40-6.120(10) to determine the size of the rock toe buttresses or keyway cuts.

(K) The fill shall be inspected for stability by a registered engineer or other qualified professional specialist experienced in the construction of earth and rockfill embankments at least quarterly throughout construction and during the following critical construction periods:

1. Removal of all organic material and topsoil;
2. Placement of underdrainage systems;
3. Installation of surface drainage systems;
4. Placement and compaction of fill materials; and
5. Revegetation.

(L) Certified report. The registered engineer or other qualified professional specialist shall provide to the director a certified report within two (2) weeks after each inspection that the fill has been constructed as specified in the design approved in the permit and plan. The report shall include appearances of instability, structural weakness and other hazardous conditions.

1. The certified report on the drainage system and protective filters shall include color photographs taken during and after construction, but before underdrains are covered with excess spoil. If the underdrain system is constructed in phases, each phase shall be certified separately.

2. Where excess durable rock spoil is placed in single or multiple lifts so that the underdrain system is constructed simultaneously with excess spoil placement by the natural segregation of dumped materials, color photographs shall be taken of the underdrain as the underdrain system is being formed.

3. The photographs accompanying each certified report shall be taken in adequate size and number with enough terrain or other physical features of the site shown to provide a relative scale to the photographs and to specifically and clearly identify the site.

4. A copy of the report shall be retained at the mine site.

(M) Coal processing waste shall not be disposed of in valley or head-of-hollow fills and only may be disposed of with underground development waste or in other excess spoil fills if that waste is—

1. Placed in accordance with 10 CSR 40-3.230(4);

2. Demonstrated to be nontoxic- and nonacid-forming; and

3. Demonstrated to be consistent with the design stability of the fill.

(N) If the disposal area contains springs, natural or man-made water courses or wet weather seeps, an underdrain system consisting of durable rock shall be constructed from the wet areas in a manner that prevents infiltration of the water into the spoil material. The underdrain system shall be protected by an adequate filter and shall be designed and constructed using standard geotechnical engineering methods.

(O) The foundation and abutments of the fill shall be stable under all conditions of construction and operation. Sufficient foundation investigations and laboratory testing of foundation materials shall be performed in order to determine the design requirements for stability of the foundation. Analyses of foundation conditions shall include the effect of underground mine workings, if any, upon the stability of the structure.

(P) Underground development waste and excess spoil may be returned to underground workings only in accordance with the disposal plans submitted under 10 CSR 40-6.120(16) and approved in the permit and plan and by the Mine Safety and Health Administration (MSHA).

(2) Disposal of Underground Development Waste and Excess Spoil in Valley Fills. Valley fills shall meet all of the requirements of section (1) of this rule and the additional requirements of this section.

(A) The fill shall be designed to attain a long-term static factor of safety of one and five-tenths (1.5.), based upon data obtained from subsurface exploration, geotechnical testing, foundation design and accepted engineering analyses.

(B) A subdrainage system for the fill shall be constructed in accordance with the following:

1. A system of underdrains constructed of durable rock shall—
 - A. Meet the requirements of paragraph (2)(B)4.;
 - B. Be installed along the natural drainage system;
 - C. Extend from the toe to the head of the fill; and
 - D. Contain lateral drains to each area of potential drainage or seepage;

2. A filter system to ensure the proper functioning of the rock underdrain system shall be designed and constructed using standard geotechnical engineering methods;

3. In constructing the underdrains, no more than ten percent (10%) of the rock may

be less than twelve inches (12") in size and no single rock may be larger than twenty-five percent (25%) of the width of the drain. Rock used in underdrains shall meet the requirements of paragraph (2)(B)4. of this rule. The minimum size of the main underdrain shall be—

Total Amount of Fill Material	Predominant Type of Fill Material	Minimum Size of Drain in Feet	
		Width	Height
Less than 1,000,000 yd ³	Sandstone	10	4
Do	Shale	16	8
More than 1,000,000 yd ³	Sandstone	16	8
Do	Shale	16	16

and

4. Underdrains shall consist of non-degradable, nonacid- or nontoxic-forming rock, such as natural sand and gravel, sandstone, limestone or other durable rock, that will not slake in water and will be free of coal, clay or shale.

(C) Underground development waste and excess spoil shall be hauled or conveyed and placed in a controlled manner and concurrently compacted as specified in the permit and plan in lifts no greater than four feet (4') or less if required in the permit and plan to—

1. Achieve the densities designed to ensure mass stability;
2. Prevent mass movement;
3. Avoid contamination of the rock underdrain or rock core; and
4. Prevent formation of voids.

(D) Surface water runoff from the area above the fill shall be diverted away from the fill and into stabilized diversion channels designed to pass safely the runoff from the one hundred (100)-year, twenty-four (24)-hour precipitation event or larger event specified in the permit and plan. Surface runoff from the fill surface shall be diverted to stabilized channels off the fill which will safely pass runoff from a one hundred (100)-year, twenty-four (24)-hour precipitation event. Diversion design shall comply with the requirements of 10 CSR 40-3.200(3)(F).

(E) The tops of the fill and any terrace constructed to stabilize the face shall be graded no steeper than 1v:20h, (5%). The vertical distance between terraces shall not exceed fifty feet (50').

(F) Drainage shall not be directed over the outslope of the fill.

(G) The outslope of the fill shall not exceed 1v:2h, (50%). The permit and plan may require a flatter slope.

(3) Disposal of Underground Development Waste and Excess Spoil: Head-of-Hollow

Fills. Disposal of underground development waste and excess spoil in the head-of-hollow fill shall meet all standards set forth in sections (1) and (2) of this rule and the additional requirements of this section.

(A) The fill shall be designed to completely fill the disposal site to the approximate elevation of the ridgeline. A rock core chimney drain may be utilized instead of the subdrain and surface diversion system required for valley fills. If the crest of the fill is not approximately at the same elevation as the low point of the adjacent ridgeline, the fill must be designed as specified in section (2) of this rule, with diversion of runoff around the fill.

(B) The alternative rock core chimney drain system shall be designed and incorporated into the construction of head-of-hollow fills as follows:

1. The fill shall have along the vertical projection of the main buried stream channel or rill a vertical core of durable rock at least sixteen feet (16') thick which shall extend from the toe of the fill to the head of the fill and from the base of the fill to the surface of the fill. A system of lateral rock underdrains shall connect this rock core to each area of potential drainage or seepage in the disposal area. Rocks used in the rock core and underdrains shall meet the requirements of subsection (2)(B) of this rule;

2. A filter system to ensure the proper functioning of the rock core shall be designed and constructed using standard geotechnical engineering methods; and

3. The grading may drain surface water away from the outslope of the fill and toward the rock core. The maximum slope of the top of the fill shall be 1v:33h, (3%). Instead of the requirements of subsection (1)(G) of this rule, a drainage pocket may be maintained at the head of the fill during and after construction to intercept surface runoff and discharge the runoff through or over the rock drain if stability of the fill is not impaired. In no case shall this pocket or sump have a potential for impounding more than ten thousand (10,000) cubic feet of water. Terraces on the fill shall be graded with a three percent to five percent (3%–5%) grade toward the fill and a one percent (1%) slope toward the rock core.

(C) The drainage control system shall be capable of safely passing the runoff from a one hundred (100)-year, twenty-four (24)-hour precipitation event or larger event specified in the permit and plan.

(4) Durable Rock Fills. In lieu of the requirements of sections (2) and (3) of this rule, the permit and plan may contain alternate methods for disposal of hard rock spoil, including fill placement by dumping in a single lift, on

a site specific basis, provided the services of a registered professional engineer experienced in the design and construction of earth and rock fill embankments are utilized and provided the requirements of this section and section (1) of this rule are met. For this section, hard rock spoil shall be defined as rock-fill consisting of at least eighty percent (80%) by volume of sandstone, limestone or other rocks that do not slake in water. Resistance of the hard rock waste or spoil to slaking shall be determined by using the slake index and slake durability tests in accordance with guidelines and criteria established by the commission or director.

(A) Waste or spoil is to be transported and placed in a specified and controlled manner which will ensure stability of the fill.

1. The method of waste spoil placement shall be designed to ensure mass stability and prevent mass movement in accordance with the additional requirements of this section.

2. Loads of noncemented clay shale, clay spoil, or both, in the fill shall be mixed with hard rock waste spoil in a controlled manner to limit on a unit basis concentrations of noncemented clay shale and clay in the fill. These materials will comprise no more than twenty percent (20%) of the fill volume as determined by tests performed by a registered engineer and approved in the permit and plan.

(B) Stability Analyses.

1. Stability analyses shall be made by the registered professional engineer. Parameters used in the stability analyses shall be based on adequate field reconnaissance, subsurface investigations, including borings and laboratory tests.

2. The embankment which constitutes the valley fill or head-of-hollow fill shall be designed with the following factors of safety:

Case	Design Condition	Minimum Factor of Safety
I	End of Construction	1.5
II	Earthquake	1.1

(C) The design of a head-of-hollow fill shall include an internal drainage system which will ensure continued free drainage of anticipated seepage from precipitation and from springs or wet weather seeps.

1. Anticipated discharge from springs and seeps and due to precipitation shall be based on records, field investigations, or both, to determine seasonal variation. The design of the internal drainage system shall be based on the maximum anticipated discharge.

2. All granular material used for the drainage system shall be free of clay and con-

sist of durable particles, such as natural sands and gravels, sandstone, limestone or other durable rock, which will not slake in water.

3. The internal drain shall be protected by a properly designed filter system.

(D) Surface water runoff from the areas adjacent to and above the fill shall not be allowed to flow onto the fill and shall be diverted into stabilized channels which are designed to safely pass the runoff from a one hundred (100)-year, twenty-four (24)-hour precipitation event. Diversion design shall comply with the requirements of 10 CSR 40-3.200(3)(F).

(E) The top surface of the completed fill shall be graded so that the final slope, after settlement, will be no steeper than 1v:20h, (5%) toward properly designed drainage channels in natural ground along the periphery of the fill. Surface runoff from the top surface of the fill shall not be allowed to flow over the outslope of the fill.

(F) Surface runoff from the outslope of the fill shall be diverted off the fill to properly designed channels which will safely pass a one hundred (100)-year, twenty-four (24)-hour precipitation event. Diversion design shall comply with the requirements of 10 CSR 40-3.200(3)(F).

(G) Terraces shall be constructed on the outslope, if required, for control of erosion or for roads included in the approved postmining land use plan. Terraces shall meet the following requirements:

1. The slope of the outslope between terrace benches shall not exceed 1v:2h, (50%);

2. To control surface runoff, each terrace bench shall be graded to a slope of 1v:20h, (5%) toward the embankment. Runoff shall be collected by a ditch along the intersection of each terrace bench and the outslope; and

3. Terrace ditches shall have a five percent (5%) slope toward the channels specified in subsection (4)(F) of this rule, unless steeper slopes are necessary in conjunction with approved roads.

*AUTHORITY: section 444.810, RSMo 1994. *Original rule filed Aug. 8, 1980, effective Dec. 11, 1980. Amended: Filed Sept. 15, 1988, effective Jan. 15, 1989. Amended: Filed July 3, 1990, effective Nov. 30, 1990.*

**Original authority 1979, amended 1983, 1993.*

10 CSR 40-3.230 Requirements for the Disposal of Coal Processing Waste for Underground Operations

PURPOSE: This rule sets forth the requirements for disposal of coal processing waste

pursuant to sections 444.810, 444.855.2(13) and (22), and 444.860.2(5), RSMo.

Editor's Note: The secretary of state has determined that the publication of this rule in its entirety would be unduly cumbersome or expensive. The entire text of the rule has been filed with the secretary of state. AASHTO T99-74 is incorporated by reference as it exists on the date of adoption of this rule. The entire text of this rule may be found at the headquarters of the agency and is available to any interested person at a cost established by state law.

(1) General Requirements.

(A) All coal processing waste shall be hauled or conveyed and placed in new and existing disposal areas approved in the permit and plan for this purpose. These areas shall be within a permit area. The disposal area shall be designed, constructed and maintained—

1. In accordance with 10 CSR 40-3.220(1) and (2), this section and sections (2)–(7) of this rule; and
2. To prevent combustion.

(B) Coal processing waste materials from activities located outside a permit area, such as those activities at other mines or abandoned mine waste piles, may be disposed of in the permit area only if approved in the permit and plan. Approval shall be based on a showing by the person who conducts underground mining activities in the permit area, using hydrologic, geologic, geotechnical, physical and chemical analyses, that disposal of these materials does not—

1. Adversely affect water quality, water flow or vegetation;
2. Create public health hazards; or
3. Cause instability in the disposal area.

(C) Refuse piles shall meet the requirements of this rule, 30 CFR 77.214 and 30 CFR 77.215.

(2) Site Inspection.

(A) All coal processing waste banks shall be inspected, on behalf of the person conducting underground mining activities, by a qualified registered professional engineer or other qualified professional specialist under the direction of the professional engineer approved in the permit and plan. The professional engineer or specialist shall be experienced in the construction of similar earth and waste structures.

1. Inspections shall occur at least quarterly, beginning within seven (7) days after preparation of the disposal area begins. The permit and plan may require more frequent inspections based upon an evaluation of the

potential danger to the health or safety of the public and potential harm to land, air and water resources. Inspections may terminate when the coal processing waste bank has been graded, covered in accordance with section (4) of this rule and topsoil has been distributed on the bank in accordance with 10 CSR 40-3.190(4), or at a later time as the commission or director may require.

2. Inspections shall include observations and tests as may be necessary to evaluate the potential hazard to human life and property, ensure that all organic material and topsoil have been removed and that proper construction and maintenance are occurring in accordance with the plan submitted under 10 CSR 40-6.120(7)–(10) and approved in the permit and plan.

3. The engineer or other approved inspector shall consider steepness of slopes, seepage and other visible factors which could indicate potential failure and the results of failure with respect to the threat to human life and property.

4. The certified report on the drainage system and protective filters shall include color photographs taken during and after construction, but before underdrains are covered with coal mine waste. If the underdrain system is constructed in phases, each phase shall be certified separately.

5. Copies of the inspection findings shall be maintained at the mine site.

(B) If any inspection discloses that a potential hazard exists, the director shall be informed promptly of the finding and of the emergency procedures formulated for public protection and remedial action. If adequate procedures cannot be formulated or implemented, the director shall be notified immediately. The director shall then notify the appropriate emergency agencies that other emergency procedures are required to protect the public from the coal processing waste area.

(3) Water Control Measures.

(A) Unless the operator satisfactorily demonstrates to the director that a subdrainage system is not required to ensure the structural integrity of a coal processing waste bank and the protection of the surface and ground water quality in the immediate vicinity of the disposal area, a properly designed subdrainage system shall be provided, which shall—

1. Intercept all groundwater sources;
2. Be protected by an adequate filter; and
3. Be covered so as to protect against the entrance of surface water or leachate from the coal processing waste.

(B) All surface drainage from the area above the coal processing waste bank and from the crest and face of the waste disposal area shall be diverted in accordance with 10 CSR 40-3.220(2)(D).

(C) Slope protection shall be provided to minimize surface erosion at the site. All disturbed areas, including diversion ditches that are not ripped, shall be vegetated upon completion of construction.

(D) Discharges of all water from a coal processing waste bank shall comply with 10 CSR 40-3.200(1), (2), (5), (6), (11) and (14).

(4) Construction Requirements.

(A) The disposal facility shall be designed using current, prudent engineering practices and shall meet any design criteria established by the director. A qualified registered professional engineer experienced in the design of similar earth and waste structures shall certify the design of the disposal facility.

(B) Coal processing waste banks shall be constructed in compliance with 10 CSR 40-3.220(1) and (2), except to the extent the requirements of those sections are specifically varied in this section.

(C) Coal processing waste banks shall have a minimum static factor of safety of one and five-tenths (1.5.).

(D) Compaction requirements during construction or modification of all coal processing waste banks shall meet the requirements of this subsection, instead of those specified in 10 CSR 40-3.220(2)(C). The coal processing waste shall be—

1. Spread in layers no more than twenty-four inches (24") in thickness; and
2. Compacted to attain ninety percent (90%) of the maximum dry density in order to prevent spontaneous combustion and to provide the strength required for stability of the coal processing waste bank. Dry densities shall be determined in accordance with the *American Association of State Highway and Transportation Officials (AASHTO) Specification T99-74 (Twelfth Edition) (July, 1978)* or an equivalent method. AASHTO T99-74 is incorporated by reference as it exists on the date of adoption of this rule.

(E) Following grading of the coal processing waste bank, the site shall be covered with a minimum of four feet (4') of the best available nontoxic and noncombustible material in accordance with 10 CSR 40-3.190(2)(E) and in a manner that does not impede flow from subdrainage systems. The coal processing waste bank shall be revegetated in accordance with 10 CSR 40-3.270. The permit and plan may allow less than four feet (4') of cover material based on physical and chemical

analyses which show that the requirements of 10 CSR 40-3.270 will be met.

(5) Burning. Coal processing waste fires shall be extinguished by the person who conducts the underground mining activities in accordance with a plan approved in the permit and plan and approved by the Mine Safety and Health Administration (MSHA). The plan shall contain, as a minimum, provisions to ensure that only those persons authorized by the operator and who have an understanding of the procedure to be used shall be involved in the extinguishing operations.

(6) Burned Waste Utilization. Before any burned coal processing waste or other materials or refuse is removed from a disposal area, approval shall be obtained from the director. A plan for the method of removal with maps and appropriate drawings to illustrate the proposed sequence of the operation and methods of compliance with this chapter shall be submitted to the director. Consideration shall be given in the plan to potential hazards which may be created by removal to persons working or living in the vicinity of the structure. The plan shall be certified by a qualified registered professional engineer.

(7) Return to Underground Workings. Coal processing waste may be returned to underground mine workings only in accordance with the waste disposal program approved in the permit and plan and by the MSHA under 10 CSR 40-6.120(10) and (16).

(8) Disposal of Noncoal Wastes.

(A) Noncoal wastes including, but not limited to, grease, lubricants, paints, flammable liquids, garbage, abandoned mining machinery, timber and other combustibles generated during underground mining activities shall be placed and stored in a controlled manner in a designated portion of the permit area. Placement and storage shall ensure that leachate and surface runoff do not degrade surface or ground water, fires are prevented and that the area remains stable and suitable for reclamation and revegetation compatible with the natural surroundings.

(B) Final disposal of noncoal wastes should be in accordance with all applicable requirements of sections 260.200–260.430, RSMo and any other federal, state and local law applicable to disposal. The place of final disposal of noncoal waste, if in the permit area, shall be designated in the permit. Permit area disposal sites shall be designed and constructed with appropriate water barriers on the bottom and sides of the designated site. Wastes shall be routinely compacted and cov-

ered to prevent combustion and windborne waste. When disposal is completed, a minimum of two feet (2') of soil cover shall be placed over the site, slopes stabilized and revegetation accomplished in accordance with 10 CSR 40-3.270. Operation of the disposal site shall be conducted in accordance with all local, state and federal requirements.

(C) At no time shall any solid waste material be deposited at refuse embankments or impoundment sites, nor shall any solid waste disposal excavation be placed within eight feet (8') of any coal outcrop or coal storage area.

(D) Any noncoal mine waste defined as hazardous under Section 3001 of the Resource Conservation and Recovery Act (RCRA) (P.L. 94-580) and 40 CFR part 261, shall be handled in accordance with the requirements of Subtitle C of RCRA and any implementing regulations.

(9) Dams and Embankments: General Requirements.

(A) Sections (9)–(11) of this rule apply to dams and embankments, constructed of coal processing waste or intended to impound coal processing waste, whether they were completed before adoption of the regulatory program or are intended to be completed after that.

(B) Waste shall not be used in the construction of dams and embankments unless it has been demonstrated that the stability of such a structure conforms with the requirements of subsection (11)(A) of this rule. It shall also be demonstrated that the use of waste material shall not have a detrimental effect on downstream water quality or the environment due to acid seepage through the dam or embankment.

(10) Dams and Embankments: Site Preparation. Before coal processing waste is placed at a dam or embankment site—

(A) All trees, shrubs, grasses and other organic material shall be cleared and grubbed from the site, and all combustibles shall be removed and stockpiled in accordance with the requirements of this chapter; and

(B) Runoff from areas above the disposal facility or runoff from the surface of the facility that may cause erosion to the embankment area or the embankment features, whether during construction or after completion, shall be diverted away from the embankment by diversion ditches that comply with the requirements of 10 CSR 40-3.200(3). Adequate outlets for discharge from these diversions shall be in accordance with 10 CSR 40-3.200(7). Diversions that are designed to divert drainage from the upstream

area away from the impoundment area shall be designed to carry the peak runoff from a one hundred (100)-year, twenty-four (24)-hour precipitation event. The diversion shall be maintained to prevent blockage and the discharges shall be in accordance with 10 CSR 40-3.200(7). Sediment control measures shall be provided at the discharge of each diversion ditch before entry into natural water courses in accordance with 10 CSR 40-3.200(1)–(6).

(11) Dams and Embankments: Design and Construction.

(A) The design of each dam and embankment constructed of coal processing waste or intended to impound that waste shall comply with the requirements of 10 CSR 40-3.200(6)(H) and (I) and (10)(B)5., and (10)(E) and (F) modified as follows:

1. The design freeboard between the lowest point on the embankment crest and the maximum water elevation shall be at least three feet (3'). The maximum water elevation shall be that determined by the freeboard hydrograph criteria contained in the United States Soil Conservation Service criteria referenced in 10 CSR 40-3.200(10);

2. The dam and embankment shall have a minimum safety factor of one and five-tenths (1.5) for the partial pool with steady seepage saturation conditions and the seismic safety factor shall be at least one and two-tenths (1.2); and

3. The dam or embankment foundation and abutments shall be designed to be stable under all conditions of construction and operation of the impoundment. Sufficient foundation investigations and laboratory testing shall be performed to determine the safety factors of the dam or embankment for all loading conditions appearing in paragraph (11)(A)2. or the publications referred to in 10 CSR 40-3.200(10) and for all increments of construction.

(B) Spillways and outlet works shall be designed to provide adequate protection against erosion and corrosion. Inlets shall be protected against blockage.

(C) Dams or embankments constructed of or impounding waste materials shall be designed so that at least ninety percent (90%) of the water stored during the design precipitation event shall be removed within a ten (10)-day period.

(D) Dams or embankments constructed of or impounding waste materials may not be retained permanently as part of the approved postmining land use.

AUTHORITY: section 444.810, RSMo 1994. Original rule filed Aug. 8, 1980, effective Dec. 11, 1980. Amended: Filed Dec. 10, 1980, effective April 11, 1981. Amended: Filed Sept. 15, 1988, effective Jan. 15, 1989. Amended: Filed July 3, 1990, effective Nov. 30, 1990. Amended: Filed May 15, 1992, effective Jan. 15, 1993.*

**Original authority 1979, amended 1983, 1993.*

10 CSR 40-3.240 Air Resource Protection

PURPOSE: This rule sets forth the requirements for the protection of air resources pursuant to section 444.810, RSMo.

(1) All exposed surface areas shall be protected attendant to erosion according to 10 CSR 40-3.200(5)(A).

AUTHORITY: section 444.810, RSMo Supp. 1999. Original rule filed Aug. 8, 1980, effective Dec. 11, 1980. Amended: Filed Dec. 10, 1980, effective April 11, 1981. Amended: Filed March 21, 2000, effective Oct. 30, 2000.*

**Original authority: 444.810, RSMo 1979, amended 1983, 1993, 1995.*

10 CSR 40-3.250 Requirements for the Protection of Fish, Wildlife and Related Environmental Values and Protection Against Slides and Other Damage

PURPOSE: This rule sets forth requirements for the protection of fish, wildlife and related environmental values and the protection against slides and other damage pursuant to sections 444.810, 444.855.2(24) and 444.860.2(11), RSMo.

Editor's Note: The secretary of state has determined that the publication of this rule in its entirety would be unduly cumbersome or expensive. The entire text of the rule has been filed with the secretary of state. Environmental Criteria for Electric Transmission System (USDI, USDA (1970)) and REA Bulletin 61-10, Powerline Contacts by Eagles and Other Large Birds are incorporated by reference as they exist on the date of adoption of this rule. The entire text of this rule may be found at the headquarters of the agency and is available to any interested person at a cost established by state law.

(1) Protection of Fish, Wildlife and Related Environmental Values.

(A) Any person conducting underground mining activities, to the extent possible using

the best technology currently available, shall minimize disturbances and adverse impacts of the activities on fish, wildlife and related environmental values and achieve enhancement of those resources where practicable.

(B) No underground mining activity shall be conducted which is likely to jeopardize the continued existence of endangered or threatened species listed by the Missouri Department of Conservation and the United States Fish and Wildlife Service or which is likely to result in the destruction or adverse modification of designated critical habitats of the species in violation of the Endangered Species Act of 1973, as amended, (16 U.S.C. 1531, et seq.). A person who conducts underground mining activities shall promptly report to the director the presence in the permit area of any critical habitat of a threatened or endangered species listed by the secretary of the interior, any plant or animal listed as threatened or endangered by the state or any bald or golden eagle of which that person becomes aware and which was not previously reported to the director by that person. Upon notification, the director shall consult with the Missouri Department of Conservation and the United States Fish and Wildlife Service and, after consultation, shall identify whether and under what conditions the operator may proceed.

(C) A person who conducts underground mining activities shall ensure that the design and construction of electric power lines and other transmission facilities used for or incidental to the underground mining activities on the permit area shall be designed and constructed in accordance with the guidelines set forth in *Environmental Criteria for Electric Transmission System* (USDI, USDA (1970)), incorporated by reference or in alternative guidance manuals approved in the permit and plan. Distribution lines shall be designed and constructed in accordance with REA Bulletin 61-10 *Powerline Contacts by Eagles and Other Large Birds*, incorporated by reference or in alternative guidance manuals approved in the permit and plan.

(D) Each person who conducts underground mining activities, to the extent possible using the best technology currently available, shall—

1. Locate and operate haul and access roads so as to avoid or minimize impacts to important fish and wildlife species or other species protected by state or federal law;

2. Fence roadways where specified in the permit and plan to guide locally important wildlife to roadway underpasses or overpasses and construct the necessary passages. No new barrier shall be located in known and important wildlife migration routes;

3. Fence, cover or use other appropriate methods to exclude wildlife from ponds which contain hazardous concentrations of toxic-forming materials;

4. Restore, enhance where practicable or avoid disturbances to habitats of unusually high value for fish and wildlife;

5. Restore, enhance where practicable or maintain natural riparian vegetation on the banks of streams, lakes and other wetland areas;

6. Afford protection to aquatic communities by avoiding stream channels as required in 10 CSR 40-3.200(16) and 10 CSR 40-3.280(4) or restoring stream channels as required in 10 CSR 40-3.200(4);

7. Not use persistent pesticides on the area during underground mining and reclamation activities unless approved in the permit and plan; and

8. Prevent, control and suppress, to the extent possible, range, forest and coal fires which are not approved in the permit and plan as part of a management plan.

(E) If fish and wildlife habitat is to be a primary or secondary postmining land use, the operator, in addition to the requirements of 10 CSR 40-3.120, shall—

1. Select plant species to be used on reclaimed areas, based on the following criteria:

A. Their proven nutritional value for fish and wildlife;

B. Their uses as cover for fish and wildlife; and

C. Their ability to support and enhance fish and wildlife habitat after release of bonds; and

2. Distribute plant groupings to maximize benefit to fish and wildlife. Plants should be grouped and distributed in a manner which optimizes edge effect, cover and other benefits for fish and wildlife.

(F) Where cropland is to be the alternative postmining land use on lands diverted from a fish and wildlife premining land use and crop management practices, the operator shall intersperse the fields with trees, hedges of fence rows throughout the harvested area to break up large blocks of monoculture and to diversify habitat types for birds and other animals.

(G) Where the primary land use is to be residential, public service or industrial land use, the operator shall intersperse reclaimed lands with greenbelts, utilizing species of grass, shrubs and trees useful as food and cover for birds and small animals.

(2) Slides and Other Damage. At any time a slide occurs which may have a potential adverse effect on public property, health,

safety or the environment, the person who conducts the underground mining activities shall notify the director by the fastest available means and comply with any remedial measures required by the director.

AUTHORITY: section 444.810, RSMo 1994. Original rule filed Aug. 8, 1980, effective Dec. 11, 1980. Amended: Filed Dec. 15, 1987, effective April 1, 1988. Amended: Filed July 3, 1990, effective Nov. 30, 1990. Amended: Filed May 15, 1992, effective Jan. 15, 1993.*

**Original authority 1979, amended 1983, 1993.*

10 CSR 40-3.260 Requirements for Backfilling and Grading for Underground Operations

PURPOSE: This rule sets forth the requirements for backfilling and grading pursuant to sections 444.810, 444.855.2(3), and 444.860.2(4), RSMo.

(1) General Requirements.

(A) Surface areas disturbed incident to underground mining activities shall be backfilled and graded in accordance with the time schedule approved in the permit and plan as a condition of the permit.

(B) Backfilling and Grading.

1. All areas affected by surface operations shall be returned to approximate original contour. All spoil shall be transported, backfilled and compacted (where advisable to ensure stability or to prevent leaching) and graded to eliminate all highwalls, spoil piles and depressions.

2. Backfilled material shall be placed to minimize adverse effects on groundwater, minimize off-site effects and support the approved postmining land use.

3. The postmining graded slopes need not be uniform.

4. Cut-and-fill terraces may be used only in those situations expressly identified in section (2) of this rule.

(2) General Grading Requirements.

(A) The final graded slopes shall not exceed in grade either the approximate pre-mining slopes or any lesser slopes approved in the permit and plan based on consideration of soil, climate or other characteristics of the surrounding area. Postmining final graded slopes need not be uniform but shall approximate the general nature of the premining topography. The requirements of this section may be modified in the permit and plan where the underground mining activities are re-affecting previously mined lands that have

not been restored to the standards of this chapter and sufficient spoil is not available to otherwise comply with this section. The person who conducts underground mining activities, at a minimum, shall—

1. Retain all overburden and spoil on the solid portion of existing or new benches; and

2. Backfill and grade to the most moderate slope possible to eliminate the highwall, which does not exceed either the angle of repose or lesser slope as is necessary to achieve a minimum static safety factor of one and three-tenths (1.3). In all cases the highwall shall be eliminated.

(B) On approval in the permit and plan and in order to conserve soil moisture, ensure stability and control erosion on final graded slopes, cut-and-fill terraces may be allowed if the terraces are compatible with the approved postmining land use and are appropriate substitutes for construction of lower grades on the reclaimed lands. The terraces shall meet the following requirements:

1. The width of the individual terrace bench shall not exceed twenty feet (20') unless specifically approved in the permit and plan as necessary for stability, erosion control or roads included in the approved postmining land use plan;

2. The vertical distance between terraces shall be as specified in the permit and plan to prevent excessive erosion and to provide long-term stability;

3. The slope of the terrace outslope shall not exceed 1v:2h (50%). Outslopes which exceed 1v:2h (50%) may be approved if they have a minimum static safety factor of more than one and three-tenths (1.3), provide adequate control over erosion and closely resemble the surface configuration of the land prior to mining. In no case may highwalls be left as part of terraces; and

4. Culverts and underground rock drains shall be used on the terrace only when approved in the permit and plan.

(C) Small depressions may be constructed if they—

1. Are approved in the permit and plan to minimize erosion, conserve soil moisture or promote vegetation;

2. Do not restrict normal access; and

3. Are not inappropriate substitutes for lower grades on the reclaimed lands.

(D) All underground mining activities on slopes above twenty degrees (20°) or on lesser slopes that the commission or director defines as steep slope shall meet the provisions of 10 CSR 40-4.040.

(E) All final grading, preparation of overburden before replacement of topsoil and replacement of topsoil shall be done along the contour to minimize subsequent erosion and

instability. If this grading, preparation or placement along the contour is hazardous to equipment operators, then grading, preparation or placement in a direction other than generally parallel to the contour may be used. In all cases, grading, preparation or placement shall be conducted in a manner which minimizes erosion and provides a surface for replacement of topsoil which will minimize slippage.

(3) Covering Coal and Acid- and Toxic-Forming Materials.

(A) Cover.

1. Exposed coal seams, acid- and toxic-forming materials and combustible materials exposed, used or produced during mining shall be adequately covered with nontoxic and noncombustible material or treated, to control the impact on surface and ground water in accordance with 10 CSR 40-3.200, to prevent sustained combustion and to minimize adverse effects on plant growth and the approved postmining land use.

2. Where necessary to protect against upward migration of salts, exposure by erosion, to provide an adequate depth for plant growth or to otherwise meet local conditions, the permit and plan shall specify thicker amounts of cover using nontoxic material.

3. Acid- or toxic-forming material shall not be buried or stored in proximity to a drainage course so as to cause or pose a threat of water pollution.

(B) Stabilization. Backfilled materials shall be selectively hauled or conveyed and compacted, wherever necessary to prevent leaching of acid- and toxic-forming materials into surface or ground waters and wherever necessary to ensure the stability of backfilled materials. The method and design specifications of compacting material shall be approved in the permit and plan before acid- and toxic-forming materials are covered.

(4) Regrading or Stabilizing Rills and Gullies. When rills or gullies deeper than nine inches (9") form in areas that have been regraded and topsoiled, the rills and gullies shall be filled, graded or otherwise stabilized and the area reseeded or replanted according to 10 CSR 40-3.270. The permit and plan shall specify that rills or gullies of lesser size be stabilized and the area reseeded or replanted if the rills or gullies are disruptive to the approved postmining land use or may result in additional erosion and sedimentation.

AUTHORITY: sections 444.530 and 444.810, RSMo 1994. Original rule filed Aug. 8, 1980, effective Dec. 11, 1980. Amended: Filed Dec. 10, 1980, effective April 11, 1981.*

Amended: Filed July 3, 1990, effective Nov. 30, 1990. Amended: Filed May 15, 1992, effective Jan. 15, 1993.

**Original authority 1979, amended 1983, 1993.*

10 CSR 40-3.270 Revegetation Requirements for Underground Operations

PURPOSE: *This rule sets forth revegetation requirements pursuant to sections 444.810, 444.855.2(19) and (20), and 444.860.2(4) and (6), RSMo.*

Editor's Note: The secretary of state has determined that the publication of this rule in its entirety would be unduly cumbersome or expensive. The entire text of the material referenced has been filed with the secretary of state. This material may be found at the Office of the Secretary of State or at the headquarters of the agency and is available to any interested person at a cost established by state law.

(1) General Requirements.

(A) The permittee shall establish on regraded areas and on all other disturbed areas, except water areas and surface areas of roads that are approved as part of the postmining land use, a vegetative cover that is in accordance with the approved permit and reclamation plan and that is to be—

1. Diverse, effective and permanent;
2. Comprised of species native to the area, or of introduced species where allowable under section (2) of this rule and necessary to achieve the approved postmining land use and approved by the regulatory authority;
3. At least equal in extent of cover to the natural vegetation of the area; and
4. Capable of stabilizing the soil surface from erosion.

(B) The reestablished plant species shall—

1. Be compatible with the approved postmining land use;
2. Have the same seasonal characteristics of growth as the original vegetation;
3. Be capable of self-regeneration and plant succession;
4. Be compatible with the plant and animal species of the area; and
5. Meet the requirements of applicable state and federal seed, poisonous and noxious plant and introduced species laws or regulations.

(C) If the postmining land use is cropland, the permanent cover required by this section shall be maintained until the Phase II liability release is obtained, after which the permanent cover may be eliminated for the purpose of growing row crops. The director may issue

a variance from the requirements to establish a permanent cover on the reclaimed cropland if the permittee can demonstrate that an alternative erosion control practice will be equally effective. For areas designated as prime farmland, the requirements of 10 CSR 40-4.030 shall apply.

(D) The regulatory authority may grant exception to the requirements of paragraphs (1)(B)2. and 3. of this rule when the species are necessary to achieve a quick-growing, temporary, stabilizing cover and measures to establish permanent vegetation are included in the approved permit and reclamation plan.

(E) When the regulatory authority approves a cropland or prime farmland postmining land use, the regulatory authority may grant exception to the requirements of paragraphs (1)(A)1. and 3., and (1)(B)2. and 3. of this rule.

(2) Use of Introduced Species. Introduced species may be used if approved in the permit and plan under the following conditions:

(A) After appropriate field trials have demonstrated that the introduced species can establish a diverse, effective and permanent cover capable of achieving the approved postmining land use;

(B) The species are necessary to achieve a quick, temporary and stabilizing cover that aids in controlling erosion and measures to establish permanent vegetation are included in the permit and plan;

(C) The species are compatible with the plant and animal species of the region; and

(D) The species meet the requirements of applicable state and federal seed or introduced species statutes and are not poisonous or noxious.

(3) Timing. Seeding and planting of disturbed areas shall be conducted during the first normal period for favorable planting conditions after final preparation. The normal period for favorable planting shall be that planting time generally accepted locally for the type of plant materials selected. When necessary to effectively control erosion, any disturbed area shall be seeded, as contemporaneously as practicable, with a temporary cover of small grains, grasses or legumes until a permanent cover is established.

(4) Mulching and Other Soil Stabilizing Practices.

(A) Suitable mulch or other soil stabilizing practices shall be used on all regraded and topsoiled areas to control erosion, to promote germination of seeds or to increase the moisture retention of the soil. The commission or director, on a case-by-case basis, may sus-

pend the requirement for mulch if the permittee can demonstrate that alternative procedures will achieve the requirements of section (6) of this rule and do not cause or contribute to air or water pollution.

(B) Mulches shall be mechanically or chemically anchored to the soil surface to assure effective protection of the soil and vegetation when required in the permit and plan.

(C) Annual grasses and grains may be used alone, as *in situ* mulch, or in conjunction with another mulch, when the commission or director determines they will provide adequate soil erosion control and will later be replaced by perennial species approved for the postmining land use.

(D) Chemical soil stabilizers alone or in combination with appropriate mulches may be used in conjunction with vegetative covers approved for the postmining land use.

(5) Grazing. When the approved postmining land use is pasture, the reclaimed land may be used for livestock grazing at a grazing capacity approved in the permit and plan approximately equal to that for similar non-mined lands for at least the last two (2) full years of liability required under subsection (6)(B) of this rule or may be used in another manner, which will determine the productive capacity approved in the permit and plan approximately equal to that for similar non-mined lands.

(6) Standards for Success.

(A) Success of revegetation shall be measured by statistically valid techniques and in accordance with guidelines established by the director and referenced under paragraph (6)(B)2. of this rule. Comparison of ground cover and productivity may be made on the basis of reference areas or criteria representative of unmined lands in the area being reclaimed or through the use of technical guidance procedures published by the United States Department of Agriculture (USDA) or United States Department of the Interior (USDI) for assessing ground cover and productivity. Management of the reference area, if applicable, shall be comparable to that which is required for the approved postmining land use of the permit area.

(B) General Requirements.

1. The ground cover and productivity of living plants on the revegetated area shall be equal to the ground cover and productivity of living plants on the approved reference area or to the standards in other technical guides approved by the commission for use in the regulatory program. The period of extended responsibility begins after the last year of

augmented seeding, fertilizing, irrigation or other work which ensure success and continues for no fewer than five (5) years.

2. Specific standards for postmining land uses.

A. For areas to be used as woodland, success in revegetation shall be determined on the basis of ground cover and tree and shrub count. Ground cover and tree and shrub stocking shall be considered acceptable if they are equal to ninety percent (90%) of the approved success standard at a ninety percent (90%) statistical confidence level for the last year of the five (5)-year responsibility period. The success standard for ground cover is a ground cover density of seventy percent (70%). The success standard for tree and shrub stocking rate shall be determined on a specific permit basis with consultation and approval of the Missouri Department of Conservation. Measurements for ground cover and productivity of living plants shall be performed in accordance with the criteria contained in the current guidelines of the Land Reclamation Commission entitled "Phase III Revegetation Success Standards For Woodland";

B. For areas to be developed for industrial/commercial land use less than two (2) years after regrading is completed, the vegetative ground cover shall not be less than required to control erosion. If the area is not developed for industrial/commercial use within two (2) years of regrading, ground cover must have a density of seventy percent (70%), at a ninety percent (90%) statistical confidence level and not be less than that required to control erosion. Measurements for ground cover shall be performed in accordance with the criteria contained in the current guidelines of the Land Reclamation Commission entitled "Phase III Success Standards For Industrial/Commercial Revegetation";

C. For areas to be used for cropland, unless otherwise approved in the permit and plan, success in revegetation of cropland shall be determined on the basis of crop production from the mined area as compared to the approved reference areas or other technical guidance procedures. Crop production from the mined area shall be equal to or greater than that of the approved standards for any two (2) years, except the first year of the five (5)-year responsibility period. Production shall not be considered equal if it is less than ninety percent (90%) of the production of the approved standard with ninety percent (90%) statistical confidence. Measurements for crop productivity shall be performed in accordance with the criteria contained in the current guidelines of the Land Reclamation

Commission entitled "Phase III Revegetation Success Standards For Cropland";

D. On areas to be developed for wildlife habitat, successful vegetation shall be determined on the basis of tree, shrub or half-shrub stocking and ground cover. The tree, shrub or half-shrub stocking shall meet the standards described in section (7) of this rule. Ground cover shall be considered acceptable if it has at least seventy percent (70%) density with ninety percent (90%) statistical confidence. The success standard for tree and shrub stocking rate shall be determined on a specific permit basis with consultation and approval of the Missouri Department of Conservation. Measurements for ground cover and stocking shall be performed in accordance with the criteria contained in the current guidelines of the Land Reclamation Commission entitled "Phase III Revegetation Success Standards For Wildlife Habitat";

E. For areas to be developed for pasture use, success of revegetation shall be determined on the basis of ground cover and the production of living plants. Ground cover and production shall be considered acceptable if they are at least ninety percent (90%) of the approved success standard at a ninety percent (90%) statistical confidence level for any two (2) years of the five (5)-year responsibility period, except the first year. The success standard for ground cover shall be ninety percent (90%) density. The success standard for hay production shall be the yield from the reference area. Measurements for ground cover and productivity of living plants shall be performed in accordance with the criteria contained in the current guidelines of the Land Reclamation Commission entitled "Phase III Revegetation Success Standards For Pasture and Previously Mined Areas";

F. For areas to be developed for prime farmland use, success of revegetation shall be determined on the basis of crop production. Crop production shall be considered acceptable if it is one hundred percent (100%) of the approved success standard at a ninety percent (90%) statistical confidence level for any three (3) years of the five (5)-year responsibility period, except the first year. The success standard for crop production shall be the yield from the reference area or other technical guidance procedures. Measurement of soil productivity shall be initiated within ten (10) years after completion of soil replacement. Measurements for crop productivity shall be performed in accordance with the criteria contained in 10 CSR 40-4.030 and in the current guidelines of the Land Reclamation Commission entitled "Phases

II/III Revegetation Success Standards For Prime Farmland";

G. For areas to be developed for a recreation land use, success of revegetation shall be determined on the basis of ground cover and tree and shrub stocking. Ground cover shall be considered acceptable if it is equal to a density of seventy percent (70%), at a ninety percent (90%) statistical confidence level. The success standard for tree and shrub stocking rate shall be determined on a specific permit basis with consultation and approval of the Missouri Department of Conservation. Measurements for ground cover and productivity of living plants shall be performed in accordance with the criteria contained in the current guidelines of the Land Reclamation Commission entitled "Phase III Revegetation Success Standards For A Recreation Land Use";

H. For areas to be developed for residential use less than two (2) years after regrading is completed, the vegetative ground cover density shall not be less than required to control erosion. If the area is not developed for residential use within two (2) years of regrading, ground cover must be equal to a density of seventy percent (70%), at a ninety percent (90%) statistical confidence level. Measurements for ground cover density shall be performed in accordance with the criteria contained in the current guidelines of the Land Reclamation Commission entitled "Program Phase III Revegetation Standards For Residential Land Use";

I. For areas previously disturbed by mining that were not reclaimed to the requirements of this subparagraph and that are reclaimed or otherwise redisturbed by surface coal mining operations, as a minimum, the vegetative ground cover shall be not less than the ground cover existing before disturbance and shall be adequate to control erosion.

(C) The person who conducts underground mining activities shall—

1. Maintain any necessary fences and proper management practices; and
2. Conduct periodic measurements of vegetation, soils and water prescribed or approved in the permit and plan to identify conditions during the applicable period of liability specified in subsection (6)(B).

(D) Vegetative ground cover shall not be less than that required to achieve the approved postmining land use.

(7) Tree and Shrub Stocking for Woodland, Wildlife Habitat and Recreation Land Uses. This section sets forth forest resource conservation standards for reforestation operations to ensure that a cover of commercial tree

species, noncommercial tree species, shrubs or half-shrubs, sufficient for adequate use of the available growing space, is established after underground mining activities.

(A) Stocking, that is, the number of stems per unit area, will be used to determine the degree to which space is occupied by well-distributed countable trees, shrubs or half-shrubs.

1. Root crown or root sprouts over one foot (1') in height shall count as one (1) toward meeting the stocking requirements. Where multiple stems occur, only the tallest stem will be counted.

2. A countable tree or shrub means a tree that can be used in calculating the degree of stocking under the following criteria:

A. The tree or shrub shall be in place at least two (2) growing seasons;

B. The tree or shrub shall be alive and healthy; and

C. The tree or shrub shall have at least one-third (1/3) of its length in live crown.

3. Rock areas, permanent road and surface water drainage ways on the revegetated area shall not require stocking.

(B) The following are the minimum performance standards for areas where woodland is the approved postmining land use:

1. The area shall have a minimum stocking of four hundred fifty (450) trees or shrubs per acre;

2. A minimum of seventy-five percent (75%) countable trees or shrubs shall be commercial tree species;

3. The number of trees or shrubs and the ground cover shall be determined using procedures described in subparagraph (6)(B)2.D. and subsection (7)(A) of this rule and the sampling method approved in the permit and plan; when the stocking is equal to or greater than four hundred fifty (≥ 450) trees or shrubs per acre and there is acceptable ground cover, the five (5)-year responsibility period required in 10 CSR 40-3.120(6)(B) shall begin; and

4. Upon expiration of the five (5)-year responsibility period, each permittee shall provide documentation showing that the stocking of trees and shrubs and the ground cover on the revegetated areas satisfy subparagraph (6)(B)2.D. and paragraph (7)(B)1. of this rule.

(C) The following are the minimum performance standards for areas where woody plants are used for wildlife management, recreation, shelter belts or forest uses other than woodland:

1. An inventory of trees, half-shrubs and shrubs shall be conducted on established reference areas according to methods approved

in the permit and plan. This inventory shall contain, but not be limited to—

A. Site quality;

B. Stand size;

C. Stand condition;

D. Site and species relations; and

E. Appropriate forest land utilization considerations;

2. The stocking of trees, shrubs, half-shrubs and the ground cover established on the revegetated area shall approximate the stocking and ground cover approved in the permit. Minimum stocking and planting arrangements shall be based on local and regional conditions after consultation with and approval from the Missouri Department of Conservation. The stocking of live woody plants shall be equal to or greater than ninety percent ($\geq 90\%$) of the stocking of wood plants of the same life form approved in the permit. When this requirement is met and acceptable ground cover is achieved, the five (5)-year responsibility period required in subsection (6)(B) of this rule shall begin; and

3. Upon expiration of the five (5)-year responsibility period, each permittee shall provide documentation showing that—

A. The woody plants established on the revegetated site are equal to or greater than ninety percent ($\geq 90\%$) of the stocking rate approved in the permit with ninety percent (90%) statistical confidence and, at the time of final bond release, at least eighty percent (80%) of the trees and shrubs used to determine success shall have been in place for sixty percent (60%) of the applicable minimum period of responsibility;

B. The ground cover on the revegetated area satisfies subparagraph (6)(B)2.D. of this rule. Species diversity, seasonal variety and regenerative capacity of the vegetation of the revegetated areas shall be evaluated on the basis of the results which could reasonably be expected using the revegetation method described in the mining and reclamation plan; and

C. Vegetative ground cover shall not be less than that required to achieve the approved postmining land use.

(8) Reclamation Schedule.

(A) In addition to completion of backfilling and grading within the schedule established in accordance with 10 CSR 40-3.260(1)(A), other aspects of reclamation shall be completed in a timely manner as follows:

1. Replacement of topsoil shall be completed within two hundred seventy (270) days of the completion of backfilling and rough grading;

2. A permanent cover sufficient to control erosion or an equivalent erosion control

practice, as approved by the director, shall be in place within two (2) years of the completion of backfilling and rough grading;

3. Within four (4) years of the completion of backfilling and rough grading—

A. Reclaimed land shall qualify for a Phase II liability release; and

B. The permittee shall submit a request for release of Phase II liability;

4. Siltation structures and diversions that are no longer needed for control of sediment shall be graded, topsoiled and seeded within eighteen (18) months after approval of a Phase II liability release of all disturbed areas within the watershed they serve. These siltation structures and diversions shall be clearly indicated by the director in the Phase II liability release inspection report;

5. Revegetation success on woodland, wildlife habitat, industrial, commercial, residential and previously mined land shall be demonstrated in the last year of the five (5)-year responsibility period;

6. Revegetation success on woodland areas and wildlife areas shall be demonstrated in the last year of the five (5)-year responsibility period;

7. Revegetation success on cropland and pasture shall be demonstrated in any two (2) years of the last four (4) years of the five (5)-year responsibility period;

8. Revegetation success on prime farmland shall be demonstrated in any three (3) years of the last four (4) years of the five (5)-year responsibility period;

9. Measurements of ground cover, productivity and tree and shrub density shall be submitted to the commission within thirty (30) days of data collection for the years the permittee uses to prove revegetation success. If a permittee is unable to demonstrate revegetation success at the end of the five (5)-year responsibility period, the responsibility period and the requirement to measure productivity shall be extended year-by-year until the revegetation success standards are met; and

10. Within six (6) months after revegetation success is demonstrated for a given area—

A. All requirements of 10 CSR 40-7.021(2)(D) shall be met; and

B. The permittee shall submit a request for release of Phase III liability to the commission.

(B) The requirements of subsection (8)(A) shall not apply to areas that are used and needed specifically for the support of ongoing reclamation or mining activities and on which grading, topsoiling, or both, cannot be completed until the areas are no longer needed for the support of ongoing reclamation or mining activities. These areas shall include, but shall

not be limited to, haul roads, siltation structures, diversions and stockpiles. The requirements of subsection (8)(A) shall apply to these areas when they are no longer needed for support activities.

(C) The director may approve variances from the requirements of paragraphs (8)(A)1.-8. if—

1. The permittee can demonstrate that unusual circumstances which are beyond his/her control have made him/her temporarily unable to conform to the requirements;

2. The variance is requested for the purpose of improving the efficiency of the management of the reclaimed land and the director determines that the variance will not unreasonably delay reclamation and the release of Phase III liability; or

3. The variance is requested for the purpose of allowing the permittee to perform reclamation that significantly exceeds the requirements of the law.

(D) A request for a variance as set out in subsection (8)(C) of this rule shall be considered the equivalent of an application for a permit revision that proposes significant alterations in the original permit and shall be subject to the requirements of 10 CSR 40-6.070 and 10 CSR 40-6.080.

AUTHORITY: section 444.810, RSMo Supp. 1999. Original rule filed Aug. 8, 1980, effective Dec. 11, 1980. Amended: Filed Dec. 10, 1980, effective April 11, 1981. Amended: Filed Dec. 9, 1982, effective April 11, 1983. Amended: Filed June 27, 1986, effective Oct. 27, 1986. Amended: Filed Dec. 15, 1987, effective April 1, 1988. Amended: Filed Sept. 15, 1988, effective Jan. 15, 1989. Amended: Filed Jan. 5, 1989, effective April 1, 1989. Amended: Filed July 3, 1990, effective Nov. 30, 1990. Amended: Filed May 15, 1992, effective Jan. 15, 1993. Amended: Filed Sept. 25, 1995, effective March 30, 1996. Amended: Filed March 21, 2000, effective Oct. 30, 2000.*

**Original authority: 444.810, RSMo 1979, amended 1983, 1993, 1995.*

10 CSR 40-3.280 Requirements for Subsidence Control Associated with Underground Mining Operations

PURPOSE: This rule sets forth the general requirements as to subsidence control associated with underground mining pursuant to sections 444.810, 444.860.2(1) and .3., RSMo.

(1) General Requirements.

(A) Underground mining activities shall be planned and conducted so as to prevent sub-

sidence from causing material damage to the surface, to the extent technologically and economically feasible and so as to maintain the value and reasonably foreseeable use of surface lands. This may be accomplished by leaving adequate coal in place, backfilling or other measures to support the surface or by conducting underground mining in a manner that provides for planned and controlled subsidence. Nothing in this chapter shall be construed to prohibit the standard method of room and pillar mining.

(B) The person engaged in underground mining activities shall comply with all provisions of the subsidence control plan prepared pursuant to 10 CSR 40-6.120(11) and approved in the permit and plan.

(C) Within a schedule approved by the commission or director, the operator shall submit a detailed plan of the underground workings. The detailed plan shall include maps and descriptions, as appropriate, of significant features of the underground mine, including the size, configuration and approximate location of pillars and entries, extraction ratios, measure taken to prevent or minimize subsidence and related damage, areas of full extraction and other information required by the commission or director.

(2) Public Notice. The mining schedule shall be distributed by mail to all owners of property and residents within the area above the underground workings and adjacent areas. Each person shall be notified by mail at least six (6) months prior to mining beneath his/her property or residence. The notification at a minimum, shall contain—

(A) Identification of specific areas in which mining will take place;

(B) Dates of mining activities that could cause subsidence and affect specific structures; and

(C) Measures to be taken to prevent or control adverse surface effects.

(3) Surface Owner Protection.

(A) Each person who conducts underground mining activities shall adopt all measures approved in the permit and plan under 10 CSR 40-6.120(11) to reduce the likelihood of subsidence, to prevent subsidence causing material damage or reducing the value or reasonably foreseeable use of surface lands and to mitigate the effect of any such damage or reduction which may occur.

(B) Each person who conducts underground mining which results in subsidence that causes material damage or reduces the value or reasonably foreseeable use of the surface lands, with respect to each surface area affected by subsidence, shall—

1. Restore, rehabilitate or remove and replace each damaged structure, feature or value, promptly after the damage is suffered to the condition it would be in if no subsidence had occurred and restore the land to a condition capable of supporting reasonably foreseeable uses it was capable of supporting before subsidence;

2. Purchase the damaged structure or feature for its fair market, presubsidence value and shall promptly, after subsidence occurs to the extent technologically and economically feasible, restore the land surface to a condition capable and appropriate of supporting the purchased structure and other foreseeable uses it was capable of supporting before mining. Nothing in this paragraph shall be deemed to grant or authorize an exercise of the power of condemnation or the right of eminent domain by any person engaged in underground mining activities; or

3. Compensate the owner of any surface structure in the full amount of the diminution in value resulting from subsidence, by purchase prior to mining of a noncancellable, premium prepaid insurance policy or other means approved in the permit and plan as assuring before mining begins that payment will occur, indemnify every person with an interest in the surface for all damages suffered as a result of the subsidence, and to the extent technologically and economically feasible, fully restore the land to a condition capable of maintaining reasonably foreseeable uses which it could support before subsidence.

(4) Buffer Zones.

(A) Underground mining activities shall not be conducted beneath or adjacent to any perennial stream or impoundment having a storage volume of twenty (20) acre-feet or more, unless the commission or director, on the basis of detailed subsurface information, determines that subsidence will not cause material damage to streams, water bodies and associated structures. If subsidence causes material damage, then measures will be taken to the extent technologically and economically feasible to correct the damage and to prevent additional subsidence from occurring.

(B) Underground mining activities beneath any aquifer that serves as a significant source of water supply to any public water system shall be conducted so as to avoid disruption of the aquifer and consequent exchange of groundwater between the aquifer and other strata. The permit and plan may prohibit mining in the vicinity of the aquifer or may limit the percentage of coal extraction to protect the aquifer and water supply.

(C) Underground mining activities shall not be conducted beneath or in close proximity to any public buildings, including, but not limited to, churches, schools, hospitals, courthouses and government offices, unless the commission or director, on the basis of detailed subsurface information, determines that subsidence from those activities will not cause material damage to these structures and specifically authorizes the mining activities in the permit and plan.

(D) The commission or director shall suspend underground coal mining under urbanized areas, cities, towns and communities and adjacent to industrial or commercial buildings, major impoundments or permanent streams if imminent danger is found to inhabitants of the urbanized areas, cities, towns or communities.

AUTHORITY: section 444.810, RSMo 1994. Original rule filed Aug. 8, 1980, effective Dec. 11, 1980. Amended: Filed Sept. 15, 1988, effective Jan. 15, 1989.*

**Original authority 1979, amended 1983, 1993.*

10 CSR 40-3.290 Requirements for Road and Other Transportation Associated with Underground Operations

PURPOSE: This rule sets forth road and other transportation requirements pursuant to section 444.810, RSMo.

Editor's Note: The secretary of state has determined that the publication of this rule in its entirety would be unduly cumbersome or expensive. The entire text of the material referenced has been filed with the secretary of state. This material may be found at the Office of the Secretary of State or at the headquarters of the agency and is available to any interested person at a cost established by law.

(1) Roads—Class I—General.

(A) Each person who conducts underground mining activities shall locate, design, construct or reconstruct, utilize and maintain Class I roads and reclaim the area to meet the requirements of sections (2)–(7) of this rule and to control or prevent erosion; siltation; the air pollution attendant to erosion, including road dust as well as dust occurring on other exposed surface, by measures such as vegetating, watering, using chemical or other dust suppressants, or otherwise stabilizing all exposed surfaces in accordance with current, prudent engineering practices; and water pollution and damage to public or private property.

(B) To the extent possible using the best technology currently available, Class I roads shall not cause damage to fish, wildlife and related environmental values and shall not cause additional contributions of suspended solids to streamflow or to runoff outside the permit area. These contributions shall not be in excess of limitations of state or federal law.

(C) All Class I roads shall be removed and the land affected regraded and revegetated in accordance with the requirements of section (7) of this rule unless—

1. Retention of the road is approved as part of the approved postmining land use or as being necessary to control erosion adequately;

2. The necessary maintenance is assured; and

3. All drainage is controlled according to section (4) of this rule.

(D) Roads—Class I—General Design.

1. The design and construction or reconstruction of Class I and II roads shall be certified by a registered qualified professional engineer in accordance with sections (2)–(5) of this rule, except to the extent that alternative specifications are used. Alternative specifications may be used only after approval in the permit and plan upon a demonstration by a registered qualified professional engineer that they will result in performance equal to or better than that resulting from Class I roads complying with sections (2)–(7) of this rule.

2. The design shall incorporate the demand for mobility and travel efficiency based on geometric criteria, both horizontal and vertical, appropriate for the anticipated volume of traffic and weight and speed of vehicles to be used.

(2) Roads—Class I—Location.

(A) Class I roads shall be located, insofar as possible, on ridges or on the most stable available slopes to minimize erosion.

(B) No part of any Class I road shall be located in the channel of an intermittent or perennial stream unless specifically approved in the permit and plan.

(C) Stream fords are prohibited unless they are specifically approved in the permit and plan as temporary routes during periods of construction. The fords shall not adversely affect stream sedimentation or fish, wildlife and related environmental values. All other stream crossings shall be made using bridges, culverts or other structures designed, constructed and maintained to meet the requirements of section (4) of this rule.

(D) Class I roads shall be located to minimize downstream sedimentation and flood-

(3) Roads—Class I—Design and Construction. Class I roads shall be designed and constructed or reconstructed in compliance with the following standards in order to control subsequent erosion and disturbance of the hydrologic balance:

(A) Vertical Alinement. Except where lesser grades are necessary to control site-specific conditions maximum road grades shall be as follows:

1. The overall grade shall not exceed 1v:10h (10%); and

2. The maximum pitch grade shall not exceed 1v:6.5h (15%); and

3. There shall be not more than three hundred feet (300') of pitch grade exceeding ten percent (10%) within any consecutive one thousand feet (1000') of Class I roads, but in no case shall there be any pitch grade over fifteen percent (15%);

(B) Horizontal Alinement. Class I roads shall have horizontal alinement as consistent with the existing topography as possible and shall provide the alinement required to meet the performance standards of sections (1)–(7) of this rule. The alinement shall be determined in accordance with the anticipated volume of traffic, weight and speed of vehicles to be used. Horizontal and vertical alinement shall be coordinated to ensure that one will not adversely affect the other and to ensure that the road will not cause environmental damage;

(C) Road Cuts.

1. Cut slopes shall not be steeper than specifically authorized in the permit and plan, which shall not authorize slopes steeper than 1v:1.5h (66%) in unconsolidated materials or 1v:0.25h (400%) in rock, except that steeper slopes may be specifically authorized in the permit and plan if geotechnical analysis demonstrates that a minimum safety factor of one and five-tenths (1.5) can be maintained.

2. Topsoil or other materials suitable under 10 CSR 40-3.190(2) shall be placed on all cut slopes of 1v:1.5h (66%) or flatter to aid in establishing vegetation and to minimize erosion. Topsoil depth shall be adequate to support vegetation necessary to control erosion.

3. Temporary erosion control measures shall be implemented during construction to minimize sedimentation and erosion until permanent control measures can be established;

(D) Road Embankments. Embankment sections shall be constructed in accordance with the following provisions:

1. All vegetative material and topsoil shall be removed from the embankment foundation during construction to increase stabil-

ity and no vegetative material or topsoil shall be placed beneath or in any Class I road embankment;

2. Where an embankment is to be placed on side slopes exceeding 1v:5h (20%), the existing ground shall be plowed, stepped or, if in bedrock, keyed in a manner which increases the stability of the fill. The keyway shall be a minimum of ten feet (10') in width and shall extend a minimum of two feet (2') below the toe of the fill;

3. Material containing by volume less than twenty-five percent (25%) of rock larger than six inches (6") in greatest dimension shall be spread in successive uniform layers not exceeding twelve inches (12") in thickness before compaction;

4. Where the material for an embankment consists of large size rock, broken stone or fragmented material that makes placing it in twelve-inch (12") layers impossible under paragraph (3)(D)3. of this rule, the embankment shall be constructed in uniform layers not exceeding in thickness the approximate average size of the rock used, but the layers shall not exceed thirty-six inches (36") in thickness. Rock shall not be dumped in final position, but shall be distributed by blading or dozing in a manner that will ensure proper placement in the embankment so that voids, pockets and bridging will be reduced to a minimum. The final layer of the embankment shall meet the requirements of paragraph (3)(D)3. of this rule;

5. Each layer of the embankment shall be completed, leveled and compacted before the succeeding layer is placed. Loads of material shall be leveled as placed and kept smooth. The successive layers shall be compacted evenly by routing the hauling and leveling equipment over the entire width of the embankment. This procedure shall be continued until no visible horizontal movement of the embankment material is apparent;

6. Embankment layers shall be compacted as necessary to ensure that the embankment is adequate to support the anticipated volume of traffic and weight and speed of vehicles to be used. In selecting the method to be used for placing embankment material, consideration shall be given in the design to factors such as the foundation, geological structure, soils, type of construction and equipment to be used. A structural and foundation analysis shall be performed to establish design standards for embankment stability appropriate to the site. Publications of the American Association of State Highway and Transportation Officers (AASHTO), including AASHTO T-99, T-180, T-191 and the modified AASHTO test or other specifications generally recognized by transportation

engineers as adequate for design of highway embankments shall be used to determine the degree of compaction required on the basis of soil type and anticipated volume of traffic and weight and speed of vehicles to be used. Compaction effort shall be adequate to achieve the degree of compaction required. No lift shall be placed on a layer until the design density is achieved throughout the layer. AASHTO specifications such as T-99, T-180, the modified AASHTO test or other comparable specifications approved in the permit and plan shall be used as guidelines for the determination of the maximum dry density for granular materials;

7. Material shall be placed in an embankment only when its moisture content is within the acceptable levels to achieve design compaction;

8. Embankment slopes shall not be steeper than 1v:2h, except that where the embankment material is a minimum of eighty-five percent (85%) rock, slopes shall not be steeper than 1v:1.35h if it has been demonstrated to the commission or director that embankment stability will result. Where rock embankments are constructed, they shall meet the requirements of paragraph (3)(D)4. of this rule;

9. The minimum safety factor for all embankments shall be one and three-tenths (1.3) or a higher factor as the permit and plan may specify;

10. The road surface shall be sloped toward the ditch line at a minimum rate of one-fourth inch (1/4") per foot of surface width or crowned at a minimum rate of one-fourth inch (1/4") per foot of surface width as measured from the center line of the road;

11. All material used in embankments shall be suitable for use under paragraphs (3)(D)1.—8. of this rule. The material shall be reasonably free of organic material, coal or coal blossom, frozen materials, wet or peat material, natural soils containing organic matter or any other material considered unsuitable in the permit and plan for use in embankment construction;

12. Excess or unsuitable material from excavations, as defined in paragraph (3)(D)11. of this rule, shall be disposed of in accordance with 10 CSR 40-3.220(1). Acid- and toxic-forming materials shall be disposed of in accordance with 10 CSR 40-3.200(8), 10 CSR 40-3.230(1) and 10 CSR 40-3.260(3);

13. Acid-producing materials shall be permitted for constructing embankments for only those Class I roads constructed or reconstructed on coal processing waste banks and only if it has been demonstrated to the commission or director that no additional acid

will leave the confines of the coal processing waste bank. In no case shall acid-bearing refuse material be used outside the confines of the coal processing waste bank. Restoration of the road shall be in accordance with the requirements of 10 CSR 40-3.260(3)—10 CSR 40-3.270(7);

14. Topsoil or other materials suitable under 10 CSR 40-3.190(3) shall be placed on all embankment slopes of 1v:1.5h or flatter to aid in establishing vegetation and to minimize erosion. Topsoil material depth shall be adequate to support vegetation and to prevent erosion;

15. Temporary erosion control measures shall be incorporated during construction to control sedimentation and minimize erosion until permanent control measures can be established; and

(E) Topsoil Removal. Before initiation of construction or reconstruction of a Class I road, topsoil and other materials, as determined under 10 CSR 40-3.190(2), shall be removed from the design roadbed, shoulders and surface where associated structures will be placed and shall be stored in accordance with 10 CSR 40-3.190(3).

(4) Roads—Class I—Drainage.

(A) General.

1. Each Class I road shall be designed, constructed, or reconstructed and maintained to have adequate structures such as, but not limited to, ditches, cross drains and ditch relief drains. The water control system shall be designed to safely pass the peak runoff from a ten (10)-year, twenty-four (24)-hour precipitation event or a greater event if required in the permit and plan.

2. Sediment control shall comply with 10 CSR 40-3.200(2) and (5).

3. Vegetation shall not be cleared for more than the width necessary for road and associated ditch construction to serve traffic needs and for utilities.

(B) Ditches.

1. A ditch shall be provided on both sides of a through-cut and on the inside shoulder of cut-and-fill section with ditch relief cross drains spaced according to grade. Water shall be intercepted before reaching a switchback or large fill and drained safely away in accordance with this section. Water from a fill or switchback shall be released below the fill, through conduits or in ripped channels and shall not be discharged onto the fill. Drainage ditches shall be placed at the toe of all cut slopes formed by the construction of roads.

2. On flat sections of Class I roads where rolling topography is insufficient to provide natural ditch drainage, the road grade

shall be undulated to provide for free flow of water in the ditch section. Road sections may be constructed to elevate the road surface above the original ground surface to facilitate drainage.

(C) Culverts and Bridges.

1. Culvert design.

A. Culverts with an end area of thirty-five (35) square feet or less shall be designed to safely pass the ten (10)-year, twenty-four (24)-hour precipitation event without a head of water at the entrance. Culverts with an end area of greater than thirty-five (35) square feet, and bridges with spans of thirty feet (30') or less, shall be designed to safely pass the twenty (20)-year, twenty-four (24)-hour precipitation event. Bridges with spans of more than thirty feet (30') shall be designed to safely pass the one hundred (100)-year, twenty-four (24)-hour precipitation event or a larger event as specified in the permit and plan.

B. Drainage pipes and culverts shall be constructed to avoid plugging or collapse and erosion at inlets and outlets.

C. Trash racks and debris basins shall be installed in the drainage ditches whenever debris from the drainage area could impair the functions of drainage and sediment control structures.

D. All culverts shall be covered by compacted fill to a minimum depth of one foot (1').

E. Culverts shall be designed, constructed and maintained to sustain the vertical soil pressure, the passive resistance of the foundation and the weight of vehicles to be used.

2. Culverts for road surface drainage only shall be constructed in accordance with the following:

A. Unless otherwise authorized or required under subparagraph (4)(C)1.B. or C. of this section, culverts shall be spaced as follows. Spacing shall not exceed:

(I) One thousand feet (1000') on grades of zero percent to three percent (0%–3%);

(II) Eight hundred feet (800') on grades of three percent to six percent (3–6%);

(III) Five hundred feet (500') on grades of six percent to ten percent (6–10%); and

(IV) Three hundred feet (300') on grades of ten percent (10%) or greater;

B. Culverts at closer intervals than the maximum in subparagraph (4)(C)2.A. of this rule shall be installed if required in the permit and plan as appropriate for the erosive properties of the soil or to accommodate flow from small intersecting drainages;

C. Culverts may be constructed at greater intervals than the maximum indicated in subparagraph (4)(C)2.A. of this rule if authorized in the permit and plan upon a finding that greater spacing will not increase erosion;

D. Culverts shall cross the road at not less than a thirty degree (30°) angle down-grade;

E. Culverts may be designed to carry less than the peak runoff from a ten (10)-year, twenty-four (24)-hour precipitation event if the ditch will not overtop and will remain stable; and

F. The inlet end shall be protected by a rock headwall or other material approved in the permit and plan as adequate protection against erosion of the headwall. The water shall be discharged below the toe of the fill through conduits or in riprapped channels and shall not be discharged onto the fill.

(D) Natural Drainage. Natural channel drainageways shall not be altered or relocated for road construction or reconstruction without prior approval in the permit and plan in accordance with 10 CSR 40-3.200(3) and (4). The alterations and relocations may be approved only if—

1. The natural channel drainage is not blocked;

2. No significant damage occurs to the hydrologic balance; and

3. There is no adverse impact on adjoining landowners.

(E) Stream Crossings. Drainage structures are required for stream channel crossings. Drainage structures shall not affect the normal flow or gradient of the stream or adversely affect fish migration and aquatic habitat or related environmental values.

(5) Roads—Class I—Surfacing.

(A) Class I roads shall be surfaced with rock, crushed gravel, asphalt or other material approved in the permit and plan as sufficiently durable for the anticipated volume of traffic and weight and speed of vehicles to be used.

(B) Acid- or toxic-forming substances shall not be used in road surfacing.

(6) Roads—Class I—Maintenance.

(A) Class I roads shall be maintained in such a manner that the required or approved design standards are met throughout the life of the entire transportation facility, including surface, shoulders, parking and side areas, approach structures, erosion control devices, cut-and-fill sections and those traffic control devices as are necessary for safe and efficient utilization of the road.

(B) Class I road maintenance shall include repairs to the road surface, blading, filling of potholes and replacement of gravel or asphalt. It shall include revegetating, brush removal, watering for dust control and minor reconstruction of road segments as necessary.

(C) Class I roads damaged by catastrophic events, such as floods or earthquakes, shall not be used until reconstruction of damaged road elements. The reconstruction shall be completed as soon as practicable after the damage has occurred.

(D) A road shall be maintained to meet the performance standards applicable in this rule and any additional criteria specified by the regulatory authority.

(7) Roads—Class I—Restoration.

(A) Unless the permit and plan approves retention of a Class I road as suitable for the approved postmining land use, immediately after the road is no longer needed for operations, reclamation or monitoring—

1. The road shall be closed to vehicular traffic;

2. The natural drainage patterns shall be restored;

3. All bridges and culverts shall be removed;

4. Roadbeds shall be ripped, plowed and scarified;

5. Fill slopes shall be rounded or reduced and shaped to conform the site to adjacent terrain and to meet natural drainage restoration standards;

6. Cut slopes shall be shaped to blend with the natural contour;

7. Cross drains, dikes and water bars shall be constructed to minimize erosion;

8. Terraces shall be constructed as necessary to prevent excessive erosion and to provide long-term stability in cut-and-fill slopes; and

9. Road surfaces shall be covered with topsoil in accordance with 10 CSR 40-3.190(4)(B) and revegetated in accordance with 10 CSR 40-3.270(1)–(6).

(B) Unless otherwise authorized in the permit and plan, all road surfacing materials shall be removed, hauled or conveyed and disposed of under 10 CSR 40-3.230(8).

(8) Roads—Class II—General.

(A) Each person who conducts underground mining activities shall locate, design, construct or reconstruct, utilize and maintain Class II roads and reclaim the area to meet the requirements of sections (9)–(14) of this rule and to control or prevent erosion; siltation; the air pollution attendant to erosion, including road dust as well as dust occurring on other exposed surfaces, by measures such

as vegetating, watering, using chemical or other dust suppressants, or otherwise stabilizing all exposed surfaces in accordance with current, prudent engineering practices; and water pollution and damage to public or private property.

(B) To the extent possible using the best technology currently available, Class II roads shall not cause damage to fish, wildlife and related environmental values and shall not cause additional contributions of suspended solids to streamflow or to runoff outside the permit area. Those contributions shall not be in excess of limitation of state or federal law.

(C) All Class II roads shall be removed and the land affected regraded and revegetated in accordance with the requirements of section (14) of this rule, unless—

1. Retention of the road is approved as part of the approved postmining land use or as being necessary to control erosion adequately;

2. The necessary maintenance is assured; and

3. All drainage is controlled according to section (11) of this rule.

(D) Roads—Class II—General Design.

1. The design and construction or reconstruction of Class II roads shall be certified by a registered professional engineer in accordance with sections (9)–(12), except to the extent that alternative specifications are used. Alternative specifications may be used only after approval in the permit and plan upon a demonstration by a qualified registered professional engineer that they will result in performance equal to or better than that resulting from Class II roads complying with sections (9)–(14) of this rule.

2. The design shall incorporate consideration of the needs of the specific uses of the road in addition to travel efficiency. To the extent that the anticipated volume of traffic or weight or speed of vehicles to be used requires higher standards than those set forth in sections (9)–(14) of this rule, these higher standards shall be incorporated in the design, construction or reconstruction and maintenance of Class II roads.

(9) Roads—Class II—Location.

(A) Class II roads shall be located, insofar as possible, on ridges or on the most stable available slopes to minimize erosion.

(B) No part of any Class II road shall be located in the channel of an intermittent or perennial stream unless specifically approved in the permit and plan.

(C) Stream fords are prohibited unless they are specifically approved in the permit and plan as temporary routes during periods of construction. The fords shall not adversely

affect stream sedimentation or fish, wildlife and related environmental values. All other stream crossings shall be made using bridges, culverts or other structures designed, constructed and maintained to meet the requirements of section (11) of this rule.

(D) Class II roads shall be located to minimize downstream sedimentation and flooding.

(10) Roads—Class II—Design and Construction. Class II roads shall be designed and constructed or reconstructed in compliance with the following standards in order to control subsequent erosion and disturbance of the hydrologic balance:

(A) Vertical Alinement. A continuous grade with excessive cuts or embankments shall be avoided. Changes of grade shall be made to conform as closely as possible to the existing terrain and maximum road grades shall be as follows:

1. The overall grade shall not exceed 1v:10h (10%);

2. The pitch grade shall not exceed 1v:6.5h (15%) for any consecutive one thousand feet (1000'); and

3. The pitch grade exceeding fifteen percent (15%) shall not be longer than three hundred feet (300') within any consecutive one thousand feet (1000') of Class II road;

(B) Horizontal Alinement. Class II roads shall have horizontal alinement as consistent with the existing natural topography as possible and shall provide the alinement required for the performance standards of sections (8)–(14) of this rule. The alinement shall be determined in accordance with the anticipated volume of traffic and weight and speed of vehicles to be used. Horizontal and vertical alinement shall be coordinated to ensure that one will not adversely affect the other and to ensure that the road will not cause environmental damage;

(C) Road Cuts. Cut slopes shall not be steeper than specifically authorized in the permit and plan, which shall not authorize slopes steeper than 1v:1.5h in unconsolidated materials or 1v:0.25h in rock, except that steeper slopes may be specifically authorized in the permit and plan if geotechnical analysis demonstrates that a minimum safety factor of one and five-tenths (1.5) can be maintained.

1. Topsoil or other material suitable under 10 CSR 40-3.190(2) shall be placed on all cut slopes of 1v:1.5h or flatter to aid in establishing vegetation and to minimize erosion. Topsoil depth shall be adequate to support vegetation necessary to minimize erosion.

2. Temporary erosion control measures shall be implemented during construction to minimize sedimentation and erosion until permanent control measures can be established;

(D) Road Embankments. Embankment sections shall be constructed in accordance with the following provisions:

1. All vegetative material and topsoil shall be removed from the embankment foundation to increase stability and no vegetative material or topsoil shall be placed beneath or in any Class II road embankment;

2. Where an embankment is to be placed on side slopes exceeding 1v:3h (33%), the existing ground shall be plowed, stepped, or if in rock, keyed in a manner which increases the stability of the fill. The keyway shall be a minimum of ten feet (10') in width and shall begin at the toe of the fill. No material shall be placed below the toe or be allowed to slide below the toe. For slopes of less than 1v:3h, (33%), the slopes shall be scarified to ensure bonding of the embankment and natural material;

3. Material containing by volume less than twenty-five percent (25%) of rock larger than six inches (6") in greatest dimension shall be spread in successive uniform layers not exceeding twelve inches (12") in thickness before compaction;

4. Where the material for an embankment consists of large size rock, broken stone or fragmented material that makes placing in twelve (12)-inch layers impossible under paragraph (10)(D)3. of this rule, the embankment shall be constructed in uniform layers not exceeding in thickness the approximate average size of the rock used, but the layers shall not exceed thirty-six inches (36") in thickness. Rock shall not be dumped in final position, but shall be distributed by blading or dozing in a manner that will ensure proper placement in the embankment so that voids, pockets and bridging will be reduced to a minimum. The final layer of the embankment shall meet the requirements of paragraph (10)(D)3. of this rule;

5. Each layer of the embankment shall be completed, leveled and compacted before the succeeding layer is placed. Embankment material shall be leveled as placed and kept smooth. The successive layers shall be compacted evenly by routing the hauling and leveling equipment over the entire width of the embankment. This procedure shall be continued until no visible horizontal movement of the embankment material is apparent;

6. Compaction greater than that specified in paragraph (10)(D)5. shall be performed to the extent necessary to ensure stability;

7. Material shall be placed in an embankment under moisture content conditions which will permit compaction and ensure proper soil cohesion;

8. Embankment slopes shall not be steeper than 1v:1.5h, except that, if the embankment material is a minimum of eighty-five percent (85%) rock, slopes shall not be steeper than 1v:1.35h if it has been demonstrated to the commission or director that embankment stability will result. Where rock embankments are constructed, they shall meet the requirements of paragraph (10)(D)4. of this rule;

9. The minimum safety factor for all embankments shall be one and three-tenths (1.3) or a higher factor as may be specified in the permit or plan;

10. The road surface shall be sloped sufficiently to prevent ponding of water on the surface;

11. All material used in embankments shall be suitable for use under paragraphs (10)(D)1.—8. of this rule. The material shall be reasonably free of organic material, coal or coal blossom, frozen materials, wet or peat material or natural soils containing organic matter or any other material considered unsuitable for use in embankment construction by the commission or director;

12. Excess or unsuitable material from excavations, as defined in paragraph (10)(D)11. of this rule, shall be disposed of in accordance with 10 CSR 40-3.220(1). Acid- and toxic-forming material shall be disposed of in accordance with 10 CSR 40-3.200(8), 10 CSR 40-3.230(1) and 10 CSR 40-3.260(3);

13. Topsoil or other material suitable under 10 CSR 40-3.190(2) shall be placed on all embankment slopes of 1v:1.5h or flatter to aid in establishing vegetation and to minimize erosion. Topsoil material depth shall be adequate to support vegetation and to minimize erosion; and

14. Temporary erosion control measures shall be incorporated during construction to control sedimentation and minimizing erosion until permanent control measures can be established; and

(E) Topsoil Removal. Before initiation of construction or reconstruction of a Class II road, topsoil and other materials, as determined under 10 CSR 40-3.190(2), shall be removed from the design roadbed, shoulders and surfaces where associated structures will be placed and shall be stored in accordance with 10 CSR 40-3.190(3).

(11) Roads—Class II—Drainage.

(A) General.

1. Each Class II road shall be designed, constructed or reconstructed and maintained to have adequate drainage, using structures such as ditches in wet areas, cross drains in natural drainageways, surface dips and stream crossings. The water control system shall be designed to safely pass the peak runoff from a ten (10)-year, twenty-four (24)-hour precipitation event or a greater event if required in the permit and plan.

2. Sediment control shall comply with 10 CSR 40-3.200(2) and (5).

(B) Ditches and Alternative Measures for Roadbed Erosion Control. Where required to minimize erosion on the roadbed, ditches shall be designed and constructed in accordance with 10 CSR 40-3.290(4)(B). In wet areas or where there is free water, these ditch sections shall be required. For every segment of a Class II road without drainage ditches which comply with subsection (4)(B), drainage shall be provided by surface dips. These drainage dips shall be constructed as undulations in the roadway of sufficient height from the hydraulic bottom to the top of the dip to prevent water from running down the surface of the road. Insloped dips shall discharge into a culvert or drop inlet. Outsloped dips shall discharge either onto the natural ground or onto embankments if a drain is provided. The bottom of the dip shall be rock surfaced to prevent erosion. Dip spacing shall be sufficient to minimize erosion of the road surface.

(C) Culverts and Bridges.

1. Culvert design.

A. Culverts with an end area of thirty-five (35) square feet or less shall be designed to safely pass the ten (10)-year, twenty-four (24)-hour precipitation event without a head of water at the entrance. Culverts with an end area of greater than thirty-five (35) square feet and bridges with spans of thirty feet (30') or less shall be designed to safely pass the twenty (20)-year, twenty-four (24)-hour precipitation event. Bridges with spans of more than thirty feet (30') shall be designed to safely pass the one hundred (100)-year, twenty-four (24)-hour precipitation event or larger event as specified in the permit and plan.

B. Drainage pipes and culverts shall be constructed to avoid plugging or collapse and erosion at inlets and outlets.

C. Culverts shall be covered by compacted fill to a minimum depth of one foot (1').

D. Culverts shall be designed, constructed and maintained to sustain the vertical soil pressure, the passive resistance of the road foundation and the weight of vehicles to be used.

2. Culverts or dips for road surface drainage only shall be constructed in accordance with the following:

A. Unless otherwise authorized or required under subparagraph (11)(C)1.B. or C. of this rule, culverts and dips shall be spaced as follows. Spacing shall not exceed:

(I) One thousand feet (1000') on grades of zero percent to three percent (0%–3%);

(II) Six hundred feet (600') on grades of three percent to six percent (3%–6%);

(III) Four hundred feet (400') on grades of six percent to ten percent (6%–10%); and

(IV) Two hundred feet (200') on grades of ten percent (10%) or greater;

B. Surface dips or culverts at closer intervals than the maximum indicated in subparagraph (11)(C)2.A. of this rule shall be installed if required in the permit and plan as appropriate for the erosive properties of the soil or to accommodate flow from small intersecting drainages;

C. Surface dips or culverts may be constructed at greater intervals than the maximum indicated in subparagraph (11)(C)2.A. of this rule if authorized in the permit and plan upon a finding that greater spacing will not increase erosion;

D. Culverts and the bottoms of drainage dips shall cross the road at not less than a thirty degree (30°) angle downgrade;

E. A culvert may be designed to carry less than the peak runoff from a ten (10)-year, twenty-four (24)-hour precipitation event if the ditch will not overtop and will remain stable; and

F. The inlet end of all culverts shall be protected by a rock headwall or other material approved in the permit and plan as adequate protection against erosion of the headwall. The water shall be discharged below the toe of the fill, through conduits or in riprapped channels and shall not be discharged onto the fill.

(D) Natural Drainage. Natural channel drainageways shall not be altered or relocated for road construction or reconstruction without prior approval in the permit and plan in accordance with 10 CSR 40-3.200(3) and (4). The commission or director may approve alterations and relocations only if—

1. The natural channel drainage is not blocked;

2. No significant degradation occurs to the hydrologic balance; and

3. There is no adverse impact on adjoining landowners.

(E) Stream Crossings. Drainage structures are required for stream channel crossings.

Drainage structures shall not affect the normal flow or gradient of the stream or adversely affect fish migration or aquatic habitat or related environmental values.

(12) Roads—Class II—Surfacing.

(A) Class II roads shall be surfaced with rock, crushed gravel, asphalt or other material approved in the permit and plan as sufficiently durable for the anticipated volume of traffic and weight and speed of vehicles to be used.

(B) Acid- or toxic-forming substances shall not be used in road surfacing.

(C) Vegetation shall not be cleared for more than the width necessary for road and associated ditch construction to serve traffic needs and for utilities.

(13) Roads—Class II—Maintenance.

(A) Class II roads shall be maintained in a manner that the required or approved design criteria are met throughout the life of the facility, including surface and shoulders, parking, side areas, approach structures, erosion control devices and these traffic control devices as are necessary for safe and efficient utilization.

(B) Class II road maintenance shall include basic custodial care as required to protect the road investment and to prevent damage to adjacent resources. This includes maintenance to control erosion, repair of structures and drainage systems, removal of rocks and debris, replacement of surface and restoration of the road prism.

(C) A road damaged by a catastrophic event, such as a flood or earthquake, shall be repaired as soon as is practicable after the damage has occurred.

(D) A road shall be maintained to meet the performance standards applicable in this rule and any additional criteria specified by the regulatory authority.

(14) Roads—Class II—Restoration.

(A) Unless the permit and plan approves retention of a Class II road as suitable for the approved postmining land use, immediately after a road is no longer needed for operations, reclamation or monitoring—

1. The road shall be closed to vehicular traffic;

2. The natural drainage patterns shall be restored;

3. All bridges and culverts shall be removed;

4. Roadbeds shall be ripped, plowed and scarified;

5. Fill slopes shall be rounded or reduced and shaped to conform the site to

adjacent terrain and to meet natural drainage restoration standards;

6. Cut slopes shall be reshaped to blend with the natural contour;

7. Cross drains, dikes and water bars shall be constructed to minimize erosion;

8. Terraces shall be constructed as necessary to prevent excessive erosion and to provide long-term stability in cut-and-fill slopes; and

9. Road surfaces shall be covered with topsoil in accordance with 10 CSR 40-3.190(4)(B) and revegetated in accordance with 10 CSR 40-3.270.

(B) Unless otherwise authorized in the permit and plan, all road-surfacing materials shall be removed, hauled or conveyed and disposed of under 10 CSR 40-3.230(8).

(15) Roads—Class III—General.

(A) Each person who conducts underground mining activities shall locate, design, construct or reconstruct, utilize and maintain Class III roads and reclaim the area to meet the requirements of 10 CSR 40-3.270 and to control or prevent erosion; siltation; the air pollution attendant to erosion, including road dust as well as dust occurring on other exposed surface, by measures such as vegetating, watering, using chemical or other dust suppressants, or otherwise stabilizing all exposed surfaces in accordance with current, prudent engineering practices; and water pollution and damage to public or private property.

(B) To the extent possible using the best technology currently available, Class III roads shall not cause damage to fish, wildlife and related environmental values and shall not cause additional contributions of suspended solids to streamflow or to runoff outside the permit area. These contributions shall not be in excess of limitations of state or federal law.

(C) All Class III roads shall be completely removed and the land affected regraded to the approximate original contour and revegetated in accordance with the requirements of section (21) of this rule, except where subsection (16)(G) of this rule shall apply.

(D) To the extent the anticipated volume of traffic or weight or speed of vehicles to be used requires higher standards than those set forth in sections (16)—(20) of this rule, these higher standards shall be incorporated in the design, construction, reconstruction or maintenance of Class III roads.

(16) Roads—Class III—Location.

(A) Class III roads shall be located on ridges or on the most stable available slopes to minimize erosion.

(B) No part of any Class III road shall be located in the channel of an intermittent or perennial stream unless specifically approved in the permit and plan.

(C) Stream fords are prohibited unless they are approved in the permit and plan as temporary routes across ephemeral or intermittent streams that will not adversely affect stream sedimentation or fish, wildlife and related environmental values. All other stream crossings shall be made using temporary bridges, culverts or other structures designed, constructed and maintained to meet the requirements of section (18) of this rule.

(D) Class III roads shall be constructed to minimize downstream sedimentation and flooding.

(E) Not later than the date a permit application is submitted to the director for underground mining activities for which a Class III road is proposed, the location of the proposed road shall be clearly marked in the field by flags or stakes to enable the director or his/her authorized representative to perform on-site review.

(F) Class III roads shall not be located in wet, steep or unstable areas where complete restoration under section (21) of this rule cannot be accomplished.

(G) A Class III road may be constructed in the same alinement as a Class I or Class II road that is to be constructed on the same location at a later date. This may be permitted if the requirements for the location of the Class I or Class II road are met and the construction begins within six (6) months from the time the Class III road is constructed.

(17) Roads—Class III—Design and Construction. Field design methods shall be utilized for Class III roads.

(A) Vertical Alinement. Except where lesser grades are necessary to control site-specific conditions, maximum road grades shall be as follows:

1. The overall grade shall not exceed 1v:10h (10%);

2. The maximum pitch grade shall not exceed 1v:5h (20%); and

3. There shall not be more than one thousand (1000) consecutive feet of maximum pitch grade.

(B) Horizontal Alinement. Class III roads may meander so as to avoid large growths of vegetation and other natural obstructions.

(C) Road Cuts. Sidecast construction may be used.

(D) Road Embankments. Compaction on embankments shall be required only to the extent necessary to control erosion and maintain the road.

(E) Topsoil Removal. Topsoil shall be removed and stockpiled only where excavation would require replacement of material and redistribution of topsoil for proper revegetation.

(18) Roads—Class III—Drainage.

(A) General.

1. Class III road drainage shall consist of temporary culverts in flowing streams, wet areas and in ephemeral channels as necessary to protect the facility during its life and to minimize disturbance of the hydrologic balance.

2. Sediment control shall comply with 10 CSR 40-3.200(2) and (5).

(B) Culverts and Bridges. Temporary culverts shall be installed for all flowing drainages and stream crossings. Temporary culverts and bridges shall be sized to safely pass the one (1)-year, six (6)-hour precipitation event.

(C) Natural Drainage. Natural channel drainageways shall not be altered or relocated for the purposes of Class III road construction.

(D) Stream Crossings. Temporary drainage structures are required for crossing permanent streams. Drainage structures shall not affect the normal flow or gradient of the stream, adversely affect fish migration and aquatic habitat or related environmental values.

(19) Roads—Class III—Surfacing.

(A) Class III road surfaces shall be adequate for the use of the road.

(B) Acid- or toxic-forming substances shall not be used in road surfacing.

(C) Vegetation shall not be cleared for more than the width necessary to serve traffic needs and for utilities.

(20) Roads—Class III—Maintenance.

(A) Class III road maintenance shall be sufficient to ensure minimization of erosion for the life of the road.

(B) Class III roads shall not be used if climatic conditions are such that usage may cause degradation of water quality.

(C) A road damaged by a catastrophic event, such as a flood or earthquake, shall be repaired as soon as is practicable after the damage has occurred.

(D) A road shall be maintained to meet the performance standards applicable in this rule and any additional criteria specified by the regulatory authority.

(21) Roads—Class III—Restoration. Immediately after a Class III road is no longer needed for operations, reclamation or monitoring—

(A) The road shall be closed to vehicular traffic;

(B) The natural drainage patterns shall be restored;

(C) All bridges and culverts shall be removed;

(D) Roadbeds shall be ripped, plowed and scarified;

(E) Fill slopes shall be rounded or reduced and shaped to conform the site to adjacent terrain and meet natural drainage restoration standards;

(F) Cut slopes shall be reshaped to blend with the natural contour;

(G) Cross drains, dikes and water bars shall be constructed to control erosion; and

(H) Road surfaces from which topsoil has been removed shall be covered with topsoil in accordance with 10 CSR 40-3.190(4)(B), and the surface shall be revegetated in accordance with 10 CSR 40-3.270.

(22) Other Transportation Facilities. Railroad loops, spurs, sidings, surface conveyor systems, shutes, aerial tramways or the transport facilities shall be designed, constructed or reconstructed and maintained and the area restored to—

(A) Prevent, to the extent possible using the best technology currently available—

1. Damage to fish, wildlife and related environmental values, and

2. Additional contributions of suspended solids to streamflow or runoff outside the permit area. These contributions shall not be in excess of limitations of state or federal law;

(B) Control and minimize diminution or degradation of water quality and quantity;

(C) Control and minimize erosion and siltation;

(D) Control and minimize air pollution; and

(E) Prevent damage to public or private property.

(23) Support Facilities and Utility Installations.

(A) Support facilities required for, or used incidentally to, the operation of the underground mine, including, but not limited to, mine buildings, coal loading facilities at or near the mine site, coal storage facilities, equipment storage facilities, fan buildings, hoist buildings, preparation plants, sheds, shops and other buildings shall be designed, constructed or reconstructed and located to prevent or control erosion and siltation, water pollution and damage to public or private property. Support facilities shall be designed, constructed or reconstructed, maintained and used in a manner which prevents, to the

extent possible using the best technology currently available—

1. Damage to fish, wildlife and related environmental values; and

2. Additional contributions of suspended solids to streamflow or runoff outside the permit area. These contributions shall not be in excess of limitations of state or federal law.

(B) All underground mining activities shall be conducted in a manner which minimizes damage, destruction or disruption of services provided by oil, gas and water wells; oil, gas and coal slurry pipelines; railroads; electric and telephone lines; and water and sewage lines which pass over, under or through the permit area, unless otherwise approved by the owner of those facilities and the permit and plan.

*AUTHORITY: section 444.810, RSMo 1994. * Original rule filed Aug. 8, 1980, effective Dec. 11, 1980. Amended: Filed July 3, 1990, effective Nov. 30, 1990.*

**Original authority 1979, amended 1983, 1993.*

10 CSR 40-3.300 Postmining Land Use Requirements for Underground Operations

PURPOSE: This rule sets forth post-mining land use requirements pursuant to sections 444.810, 444.855.2(2) and 444.860.2(6), RSMo.

(1) General. Surface land areas affected by mining activities shall be restored in a timely manner to—

(A) Conditions that are capable of supporting the use which they were capable of supporting before any mining; and

(B) Higher or better uses achievable under criteria and procedures of this section.

(2) Determining Premining Use of Land. The premining uses of land to which the postmining land use is compared shall be those uses which the land previously supported, if the land had not been previously mined and had been properly managed.

(A) The postmining land use for land that has been previously mined and not reclaimed shall be judged on the basis of the uses which it was capable of supporting prior to any mining, the highest and best use that can be achieved and is compatible with surrounding areas and does not require the disturbance of areas previously unaffected by mining.

(B) The postmining land use for land that has received improper management shall be judged on the basis of the premining use of the surrounding lands that have received proper management.

(C) If the premining use of the land was changed within five (5) years of the beginning of mining, the comparison of postmining use to premining use shall include a comparison with the historic use of the land as well as its use immediately preceding mining.

(3) Prior to the release of lands from the permit area in accordance with 10 CSR 40-8.030(2)(C), the permit area shall be restored, in a timely manner, either to conditions capable of supporting the uses they were capable of supporting before any mining or to conditions capable of supporting approved alternative land uses. Alternative land uses may be approved in the permit and plan after consultation with the landowner or the land management agency having jurisdiction over the lands, if the following criteria are met:

(A) The proposed postmining land use is compatible with adjacent land use and, where applicable, with existing local, state or federal land use policies and plans, a written statement of the views of the authorities with statutory responsibilities for land use policies and plans shall have been submitted to the director within sixty (60) days of notice by the director before underground mining activities begin. Any required approval of local, state or federal land management agencies, including any necessary zoning or other changes required for the land use, shall have been obtained and shall remain valid throughout the underground mining activities;

(B) Specific plans shall be prepared and submitted to the director which show the feasibility of the postmining land use as related to projected land use trends and markets and that include a schedule showing how the proposed use will be developed and achieved within a reasonable time after mining and be sustained. The commission or director may require appropriate demonstrations to show that the planned procedures are feasible, reasonable and integrated with mining and reclamation and that the plans will result in successful reclamation;

(C) For public facilities, the operator demonstrates a reasonable likelihood of sustaining higher or better use;

(D) Specific and feasible plans are submitted to the director which show that financing and attainment and maintenance of the postmining land use are feasible and, if appropriate, are supported by letters of commitment from parties other than the persons who conduct the underground mining activities;

(E) Plans for the postmining land use shall have been designed under the general supervision of a registered professional engineer, or other appropriate professional, who will ensure that the plans conform to applicable

accepted standards for adequate land stability, drainage, vegetative cover and aesthetic design appropriate for the postmining use of site;

(F) The proposed use(s) will neither present actual or probable hazard to public health or safety nor will they pose any actual or probable threat water flow diminution or pollution;

(G) The use will not involve unreasonable delays in reclamation.

(H) Necessary approval of measures to prevent or mitigate adverse effects on fish, wildlife and related environmental values and threatened or endangered plants shall have been obtained from the director appropriate state and federal fish and wildlife management agencies have been provided a sixty (60)-day period in which to review the plan before underground mining activities begin; and

(I) Proposals to change premining land uses of range, fish and wildlife habitat, forest land, hayland or pasture to a postmining cropland use, where the cropland would require continuous maintenance such as seeding, plowing, cultivation, fertilization or other similar practices to be practicable or to comply with applicable federal, state and local laws have been reviewed by the director to ensure that—

1. There is sufficient water available and committed to maintain p production; and
2. Topsoil quality and depth sufficient to support the proposed use.

*AUTHORITY: section 444.810, RSMo 1994. * Original rule filed Aug. 8, 1980, effective Dec II, 1980. Amended: Filed Dec. 10, 1980, effective April II, 1981. Amended: Filed July 3, 1990, effective Nov. 30, 1990.*

**Original authority 1979, amended 1983, 1993.*

10 CSR 40-3.310 Coal Recovery, Land Reclamation and Cessation of Operation for Underground Operations

PURPOSE: This rule sets forth requirements for coal recovery, contemporaneous land reclamation, and temporary and permanent cessation of underground mining activities pursuant to sects 444.810 and 444.855.2(16), RSMo.

(1) Coal Recovery. Underground mining activities shall be conducted so as to maximize the utilization conservation of the coal, while utilizing the best technology currently available to maintain environmental integrity, so that reffecting the land in the future

through surface coal mining options is minimized.

(2) Contemporaneous Reclamation. Reclamation efforts, including, but not limited backfilling, grading, topsoil replacement and revegetation, of all areas affected by surface operations shall occur as contemporaneously as practicable with mining operations.

(3) Cessation of Operations—Temporary.

(A) Each person who conducts underground mining activities shall effectively support and maintain all surface access openings to underground operations and secure surface facilities in areas in which there are no current operations, but operations are to be resumed under an approved permit. Temporary abandonment shall not relieve a person of his/her obligation to comply with any provision of the approved permit.

(B) Before temporary cessation of mining and reclamation operations for a period of thirty (30) days or more, or as soon as it is known that a temporary cessation will extend beyond thirty (30) days, each person who conducts underground mining activities shall submit to the director a notice of intention to cease or abandon operations This notice shall include a statement of the exact number of surface acres and the horizontal and vertical extent of subsurface strata which have been in the permit area prior to cessation or abandonment, the extent and the kind of reclamation of surface area which will have been accomplished and identification the backfilling, regrading, revegetation, environmental monitoring, underground opening closures and water treatment activities that will continue during the temporary cessation.

(4) Cessation of Operations—Permanent.

(A) The person who conducts underground mining activities shall close or backfill or otherwise permanently reclaim all affected areas in accordance with the permit and plan.

(B) All surface equipment, structures or other facilities not required for continued underground mining activities and monitoring, unless approved as suitable for the postmining land use or environmental monitoring, shall be removed and the affected lands reclaimed.

*AUTHORITY: section 444.810, RSMo 1994. * Original rule filed Aug. 8, 1980, effective Dec. II, 1980.*

**Original authority 1979, amended 1983, 1993.*