WEST VIRGINIA
SECRETARY OF STATE
KEN HECHLER
ADMINISTRATIVE LAW DIVISION

Form #7

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OFFICE OF WEST VIRGINIA
SECRETARY OF STATE

NOTICE OF AN EMERGENCY RULE

AGENCY: West Virginia Department of Energy TITLE NUMBER: 38

CITE AUTHORITY: West Virginia Code 22-1-15 and 22A-1A2

EMERGENCY AMENDMENT TO AN EXISTING RULE: YES X, NO ___

IF YES, SERIES NUMBER OF RULE BEING AMENDED: 10

TITLE OF RULE BEING AMENDED: Rules and Regulations Governing Roof Control

IF NO, SERIES NUMBER OF RULE BEING FILED AS AN EMERGENCY: NA

TITLE OF RULE BEING FILED AS AN EMERGENCY: NA

THE ABOVE RULE IS BEING FILED AS AN EMERGENCY RULE TO BECOME EFFECTIVE UPON FILING.

THE FACTS AND CIRCUMSTANCES CONSTITUTING THE EMERGENCY ARE AS FOLLOWS:

See attached statement

Use Additional Sheets If Necessary.

Roger T. Hall
Roger T. Hall
Administrator

FACTS AND CIRCUMSTANCES CONSTITUTING AN EMERGENCY

The West Virginia Department of Energy's Division of Mine Health, Safety and Training works competitively with the federal Mine Health and Safety Administration (MSHA) in developing its regulations and policies. This arrangement is necessary to maintain consistency between state and federal inspection and enforcement programs.

MSHA has recently modified its regulations and procedures at 30 CFR, Part 75, Subpart C, relative to submission and approval of roof control plans. These changes have resulted in the deletion of certain requirements for roof control plans. The state has heretofore relied on these requirements for certain essential safety procedures to be carried out in underground operations. Therefore, it is necessary for the state to adopt regulations which will reinstate these requirements to authorize continued inspection and enforcement activities essential to the safety of underground coal miners. Thus, the filing of these regulations on an emergency basis is justified.

WEST VIRGINIA LEGISLATIVE RULE
DEPARTMENT OF ENERGY
TITLE 38 SERIES 10

TITLE: Rules and Regulations Governing Roof Control

Type of Rule: Legislative

Section 38-10-1 General.

1.1 Scope. This series sets forth requirements for controlling roof, face, and ribs, including coal or rock bursts, in underground coal mines. Roof control systems installed prior to the effective date of this series are not affected so long as the support system continues to effectively control the roof, face, and ribs.

1.2 Applicability. These rules and regulations apply to all underground mining operations throughout the State of West Virginia as they relate to control of mine roof, face, and ribs.

1.3 Authority. West Virginia Code 22-1-15 and 22A-1A-2

1.4 Filing Date. May 6, 1988

1.5 Effective Date.

1.6 Repeal of Former Rule. This legislative rule repeals West Virginia rules and regulations governing roof control, Title 38, Series 10, filed with the Office of the Secretary of State on December 16, 1986, passed by the West Virginia Legislature March 12, 1988, and became effective May 1, 1988.

38-10-2 Definitions: As used in these regulations, unless used in a context that clearly requires a different meaning, the term:

2.1 Pillar recovery means any reduction in pillar size during retreat mining.

38-10-3 Protection from falls of roof, face, and ribs.

(a) The roof, face, and ribs of areas where persons work or travel shall be supported or otherwise controlled to protect persons from hazards related to falls of the roof, face, or ribs and coal or rock bursts.

(b) No person shall work or travel under unsupported roof unless in accordance with this series.

38-10-4 Mining methods.

(a) The method of mining shall not expose any person to hazards caused by excessive widths of rooms, crosscuts and entries, or faulty pillar recovery methods. Pillar dimensions shall be compatible with effective control of the roof, face, and ribs and coal or rock bursts.

(b) A sightline or other method of directional control shall be used to maintain the projected direction of mining in entries, rooms, crosscuts, and pillar splits.

(c) A sidecut shall be started only from an area that is supported in accordance with the roof control plan.

(d) A working face shall not be mined through into an unsupported area of active workings, except when the unsupported area is inaccessible.

(e) Additional roof support shall be installed where:

(1) The width of the opening specified in the roof control plan is exceeded by more than twelve (12) inches; and

(2) The distance over which the excessive width exists is more than five (5) feet.

(f) The diameter of finishing bits shall be within a tolerance of plus or minus 0.030 inch of the manufacturer's recommended hole diameter for the anchor used.

(g) When separate finishing bits are used, they shall be distinguishable from other bits.

(h) Tensioned roof bolts:

(1) Roof bolts that provide support by creating a beam of laminated strata shall be at least thirty (30) inches long.

Roof bolts that provide support by suspending the roof from overlying stronger strata shall be long enough to anchor at least twelve (12) inches into the stronger strata.

(2) Test holes, spaced at intervals specified in the roof control plan, shall be drilled to a depth of at least twelve (12) inches above the anchorage horizon of mechanically anchored tensioned bolts being used. When a test hole indicates that bolts would not anchor in competent strata, corrective action shall be taken.

(3) The installed torque or tension ranges for roof bolts as specified in the roof control plan shall maintain the integrity of the support system and shall not exceed the yield point of the roof bolt nor anchorage capacity of the strata.

(4) In each roof bolting cycle, the actual torque or tension of the first tensioned roof bolt installed with each drill head shall be measured immediately after it is installed. Thereafter, for each drill head used, at least one roof bolt out of every four installed shall be measured for actual torque or tension. If the torque or tension of any of the roof bolts measured is not within the range specified in the roof control plan, corrective action shall be taken.

(5) In working places from which coal is produced during any portion of a twenty-four (24) hour period, the actual torque or tension on at least one out of every ten previously installed mechanically anchored tensioned roof bolts shall be measured from the outby corner of the last open crosscut to the face in each advancing section. Corrective action shall be taken if the majority of the bolts measured:

(A) Do not maintain at least seventy (70) percent of the minimum torque or tension specified in the roof control plan, fifty (50) percent if the roof bolt plates bear against wood; or

(B) Have exceeded the maximum specified torque or tension by fifty (50) percent.

(6) The mine operator or a person designated by the operator shall certify by signature and date that measurements required by Subsection (h)(5) of this section have been made. This certification shall be maintained for at least one year and shall be made available to an authorized representative of the Director of the Division of Health, Safety and Training and representatives of the miners.

(7) Tensioned roof bolts installed in the roof support pattern shall not be used to anchor trailing cables or used for any other purpose that could affect the tension of the bolt. Hanging trailing cables, line brattice, telephone lines, or other similar devices which do not place sudden loads on the bolts are permitted.

38-10-5 Roof Bolting.

(a) For roof bolts and accessories addressed in ASTM F432-83, "Standard Specification for Roof and Rock Bolts and Accessories", the mine operator shall:

(1) Obtain a manufacturer's certification that the material was manufactured and tested in accordance with the specifications of ASTM F432-83; and

(2) Make this certification available to an authorized representative of the Director of the Division of Health, Safety and Training.

(b) Roof bolts and accessories not addressed in ASTM F432-83 may be used provided they:

(1) Have been successful in supporting the roof in an area of a coal mine with similar strata, opening dimensions, and roof stresses; or

(2) Have been tested and shown to be effective for supporting the roof in an area of the affected mine which has similar strata, opening dimensions and roof stresses as the area where the roof bolts are to be used. During the test process, access to the test area shall be limited to persons necessary to conduct the test.

(c) (1) A bearing plate shall be firmly installed with each roof bolt.

(2) Bearing plates used directly against the mine roof shall be at least six (6) inches square or the equivalent, except that where the mine roof is firm and not susceptible to sloughing, bearing plates five (5) inches square or the equivalent may be used.

(3) Bearing plates used with wood or metal materials shall be at least four (4) inches square or the equivalent.

(4) Wooden materials that are used between a bearing plate and the mine roof in areas which will exist for three (3) years or more shall be treated to minimize deterioration.

(d) (1) When washers are used with roof bolts, the washers shall conform to the shape of the roof bolt head and bearing plate.

(2) Angle compensative devices shall be used to compensate for the angle when tensioned roof bolts are installed at angles greater than five (5) degrees from the perpendicular to the bearing plate.

(e) Non-tensioned grouted roof bolts. The first non-tensioned grouted roof bolt installed during each roof bolting cycle shall be tested during or immediately after the first row of bolts has been installed, If the bolt tested does not withstand at least one hundred fifty (150) foot-pounds of torque without rotating in the hole, corrective action shall be taken.

38-10-6 Installation of roof support using mining machines with integral roof bolters. When roof bolts are installed by a continuous mining machine with integral roof bolting equipment:

(a) The distance between roof bolts shall not exceed ten (10) feet crosswise.

(b) Roof bolts to be installed nine (9) feet or more apart shall be installed with a wooden crossbar at least three (3) inches thick and eight (8) inches wide, or material which provides equivalent support.

(c) Roof bolts to be installed more than eight (8) feet but less than nine (9) feet apart shall be installed with a wooden plank at least two (2) inches thick and eight (8) inches wide, or material which provides equivalent support.

38-10-7 Conventional roof support.

(a) When conventional roof support materials are used as the only means of support:

(1) The width of any opening shall not exceed twenty (20) feet;

(2) The spacing of roadway roof support shall not exceed five (5) feet;

(3) (A) Supports shall be installed to within five (5) feet of the uncut face;

(B) When supports nearest the face must be removed to facilitate the operation of face equipment, equivalent temporary support shall be installed prior to removing the supports;

(4) Straight roadways shall not exceed sixteen (16) feet wide where full overhead support is used and fourteen (14) feet wide where only posts are used;

(5) Curved roadways shall not exceed sixteen (16) feet wide; and

(6) The roof at the entrance of all openings along travelways which are no longer needed for storing supplies or for travel of equipment shall be supported by extending the line of support across the opening.

(b) Conventional roof support materials shall meet the following specifications:

(1) The minimum diameter of cross-sectional area of wooden posts shall be as follows:

Post length (in inches)	Diameter of round posts (in inches)	Cross-sectional area of split posts(in square inches)
60 or less	4	13
Over 60 to 84	5	20
Over 84 to 108	6	28
Over 106 to 132	7	39
Over 132 to 156	8	50
Over 156 to 180	9	64
Over 180 to 204	10	79
Over 204 to 228	11	95
Over 228	12	113

(2) Wooden materials used for support shall have the following dimensions:

(A) Cap blocks and footings shall have flat sides and be at least two (2) inches thick, four (4) inches wide and twelve (12) inches long.

(B) Crossbars shall have a minimum cross-sectional area of twenty-four (24) square inches and be at least three (3) inches thick.

(C) Planks shall be at least six (6) inches wide and one (1) inch thick.

(3) Cribbing materials shall have at least two (2) parallel flat sides.

(c) A cluster of two or more posts that provide equivalent strength may be used to meet the requirements of paragraph (b)(1) of this section, except that no post shall have a diameter less than four (4) inches or have a cross-sectional area less than thirteen (13) square inches.

(d) Materials other than wood used for support shall have support strength at least equivalent to wooden material meeting the applicable provisions of this section.

(e) Posts and jacks shall be tightly installed on solid footings.

(f) When posts are installed under roof susceptible to sloughing a cap block, plank, crossbar, or materials that are equally effective shall be placed between the post and the roof.

(g) Blocks used for lagging between the roof and crossbars shall be spaced to distribute the load.

(h) Jacks used for roof support shall be used with at least thirty-six (36) square inches of roof bearing surface.

38-10-8 Pillar recovery. Pillar recovery shall be conducted in the following manner, unless otherwise specified in the roof control plan:

(a) Full and partial pillar recovery shall not be conducted on the same pillar line, except where physical conditions such as unstable floor or roof, falls of roof, oil and gas well barriers or surface subsidence require that pillars be left in place.

(b) Before mining is started in a pillar split or lift:

(1) At least two rows of breaker posts or equivalent support shall be installed:

(A) As close to the initial intended breakline as practicable; and

(B) Across each opening leading into an area where full or partial pillar extraction has been completed.

(2) A row of roadside-radius (turn) posts or equivalent support shall be installed leading into the split or lift.

(c) Before mining is started on a final stump:

(1) At least two (2) rows of posts or equivalent support shall be installed on not more than four (4)- foot centers on each side of the roadway; and

(2) Only one (1) open roadway, which shall not exceed sixteen (16) feet wide, shall lead from solid pillars to the final stump of a pillar. Where posts are used as the sole means of roof support, the width of the roadway shall not exceed fourteen (14) feet.

(d) During open-end pillar extraction, at least two (2) rows of breaker posts or equivalent support shall be installed on not more than four (4)- foot centers. These supports shall be installed between the lift to be started and the area where pillars have been extracted. These supports shall be maintained to within seven (7) feet of the face and the width of the roadway shall not exceed sixteen (16) feet. Where posts are used as the sole means of roof support, the width of the roadway shall not exceed fourteen (14) feet.

38-10-9 Warning devices. Except during the installation of roof supports, the end of permanent roof support shall be posted with a readily visible warning, or a physical barrier shall be installed to impede travel beyond permanent support.

38-10-10 Manual installation of temporary support.

(a) When manually installing temporary support, only persons engaged in installing the support shall proceed beyond permanent support.

(b) When manually installing temporary supports, the first temporary support shall be set no more than five (5) feet from a

permanent roof support and the rib. All temporary supports shall be set so that the person installing the supports remains between the temporary support being set and two other supports which shall be no more than five (5) feet from the support being installed. Each temporary support shall be completely installed prior to installing the next temporary support.

(c) All temporary supports shall be placed on no more than five (5)- foot centers.

(d) Once temporary supports have been installed, work or travel beyond permanent roof support shall be done between temporary supports and the nearest permanent support or between other temporary supports.

38-10-11 Roof testing and scaling.

(a) A visual examination of the roof, face, and ribs shall be made immediately before any work is started in an area and thereafter as conditions warrant.

(b) Where the mining height permits and the visual examination does not disclose a hazardous condition, sound and vibration roof tests, or other equivalent tests, shall be made where supports are to be installed. When sound and vibration tests are made, they shall be conducted:

(1) After the ATRS system is set against the roof and before other support is installed; or

(2) Prior to manually installing a roof support. This test shall begin under supported roof and progress no further than the location where the next support is to be installed.

(c) When a hazardous roof, face, or rib condition is detected, the condition shall be corrected before there is any other work or travel in the affected area. If the affected area is left unattended, each entrance to the area shall be posted with a readily visible warning, or a physical barrier shall be installed to impede travel into the area.

(d) A bar for taking down loose material shall be available in the working place or on all face equipment except haulage equipment. Bars provided for taking down loose material shall be of a length and design that will allow the removal of loose material from a position that will not expose the person performing this work to injury from falling material.

38-10-12 Rehabilitation of areas with unsupported roof.

(a) Before rehabilitating each area where a roof fall has occurred or the roof has been removed by mining machines or by blasting:

(1) The mine operator shall establish the clean up and support procedures that will be followed;

(2) All persons assigned to perform rehabilitation work shall be instructed in the clean-up and support procedures; and

(3) Ineffective, damaged, or missing roof support at the edge of the area to be rehabilitated shall be replaced or other equivalent support installed.

(b) All persons who perform rehabilitation work shall be experienced in this work or they shall be supervised by a person experienced in rehabilitation work who is designated by the mine operator.

(c) Where work is not being performed to rehabilitate an area in active workings where a roof fall has occurred or the roof has been removed by mining machines or by blasting, each entrance to the area shall be supported by at least one row of posts on not more than five (5)- foot centers, or equally effective support.

38-10-13 Roof support removal.

(a) (1) All persons who perform the work of removing permanent roof supports shall be experienced in this work, or they shall be supervised by a person experienced in removing roof supports who is designated by the mine operator.

(2) Only persons with at least one (1) year of underground mining experience shall perform permanent roof support removal work.

(b) A person designated by the mine operator shall, prior to the removal of permanent roof supports, examine the roof conditions in the area where the supports are to be removed.

(c) Prior to the removal of crossbars, beams, or other similar supports, a row of temporary supports on not more than five (5)- foot centers or equivalent support shall be installed

across the opening within four (4) feet of the supports being removed. Additional supports shall be installed where necessary to assure safe removal.

(d) (1) Prior to the removal of roof bolts, temporary support shall be installed as close as practicable to each bolt being removed. After the removal of roof bolts, persons removing the temporary supports shall perform this work from a location under permanent supports which have not been disturbed.

(2) Roof bolts shall not be removed where full pillar extraction is conducted.

(e) Each entrance to an area where supports have been removed shall be posted with a readily visible warning or a physical barrier shall be installed to impede travel into the area.

(f) Except when supports are removed by persons who are in a remote location under supported roof, no permanent support shall be removed where:

(1) Roof bolt torque or tension measurements or the condition of conventional support indicate excessive loading;

(2) Roof fractures are present; or

(3) There is any other indication that the roof is structurally weak.

(g) Except for paragraph (b) of this section, the provisions of this section do not apply to removal of conventional supports for starting crosscuts and pillar splits or lifts.

38-10-14 Supplemental support materials, equipment, and tools.

(a) A supply of supplementary roof support materials and the tools and equipment necessary to install the materials shall be available at a readily accessible location on each working section or within four (4) crosscuts of each working section.

(b) The quantity of support materials and tools and equipment maintained available in accordance with this section shall be sufficient to support the roof if adverse roof conditions are encountered, or in the event of an accident involving a fall.

38-10-15 Longwall mining systems. For each longwall mining section, the roof control plan shall specify:

(a) The methods that will be used to maintain a safe travelway out of the section through the tailgate side of the longwall; and

(b) The procedures that will be followed if a ground failure prevents travel out of the section through the tailgate side of the longwall.

38-10-16 Roof control plan.

(a) (1) Each mine operator shall develop and follow a roof control plan, approved by the Director of the Division of Health, Safety and Training, that is suitable to the prevailing geological conditions, and the mining system to be used at the mine. Additional measures shall be taken to protect persons if unusual hazards are encountered.

(2) The proposed roof control plan and any revisions to the plan shall be submitted, in writing, to the Director of the Division of Health, Safety and Training. When revisions to a roof control plan are proposed, only the revised pages need to be submitted unless otherwise specified by the Director of the Division of Health, Safety and Training.

(b) (1) The mine operator will be notified in writing of the approval or denial of approval of a proposed roof control plan or proposed revision.

(2) When approval of a proposed plan or revision is denied, the deficiencies of the plan or revision and recommended changes will be specified and the mine operator will be afforded an opportunity to discuss the deficiencies and changes with the roof control inspectors or Director of the Division of Health, Safety and Training.

(3) Before new support materials, devices or systems other than roof bolts and accessories, are used as the only means of roof support, the Director of the Division of Health, Safety and Training may require that their effectiveness be demonstrated by experimental installations.

(c) No proposed roof control plan or revision to a roof control plan shall be implemented before it is approved.

(d) Before implementing an approved revision to a roof control plan, all persons who are affected by the revision shall be instructed in its provisions.

(e) The approved roof control plan and any revisions shall be available to the miners and representative of miners at the mine.

(f) Existing roof control plans that conflict with this series shall be revised to meet the requirements of this series by September 28, 1988. This paragraph (f) shall expire March 28, 1989.

38-10-17 Roof control plan information.

(a) The following information shall be included in each roof control plan:

(1) The name and address of the company.

(2) The name, address, mine identification number, and location of the mine.

(3) The name and title of the company official responsible for the plan.

(4) A typical columnar section of the mine strata which shall:

(A) Show the name and the thickness of the coalbed to be mined and any persistent partings;

(B) Identify the type and show the thickness of each stratum up to and including the main roof above the coalbed and for distance of at least ten (10) feet below the coalbed; and

(C) Indicate the maximum cover over the area to be mined.

(5) A description and drawings of the sequence of installation and spacing of supports for each method of mining used.

(6) When an ATRS system is used, the maximum distance that an ATRS system is to be set beyond the last row of permanent support.

(7) When tunnel liners or arches are to be used for roof support, specifications and installation procedures for the liners or arches.

(8) Drawings indicating the planned width of openings, size of pillars, method of pillar recovery, and the sequence of mining pillars.

(9) A list of all support materials required to be used in the roof, face, and rib control system, including, if roof bolts are to be installed:

(A) The length, diameter, grade and type of anchorage unit to be used;

(B) The drill hole size to be used; and

(C) The installed torque or tension range for tensioned roof bolts.

(10) When mechanically anchored tensioned roof bolts are used, the intervals at which test holes will be drilled.

(11) A description of the method of protecting persons:

(A) From falling material at drift openings; and

(B) When mining approaches within one hundred fifty (150) feet of an outcrop.

(b) Each drawing submitted with a roof control plan shall contain a legend explaining all symbols used and shall specify the scale of the drawing which shall not be less than five (5) feet to the inch or more than twenty (20) feet to the inch.

(c) All roof control plan information, including drawings, shall be submitted on 8 1/2 by 11 inch paper, or paper folded to this size.

38-10-18 Roof control plan-approval criteria.

(a) This section sets forth the criteria that shall be considered on a mine-by-mine basis in the formulation and approval of roof control plans and revisions. Additional measures may be required in plans by the Director of the Division of Health, Safety and Training or authorized representative. Roof control plans that do not conform to the applicable criteria in this section may be approved by the Director of the Division

of Health, Safety and Training or authorized representative, provided that effective control of the roof, face, and ribs can be maintained.

(b) Roof Bolting.

(1) Roof bolts should be installed on centers not exceeding five (5) feet lengthwise and crosswise, except as specified in Section 6.

(2) When tensioned roof bolts are used as a means of roof support, the torque or tension range should be capable of supporting roof bolt loads of at least fifty (50) percent of either the yield point of the bolt or anchorage capacity of the strata, whichever is less.

(3) Any opening that is more than twenty (20) feet wide should be supported by a combination of roof bolts and conventional supports.

(4) In any opening more than twenty (20) feet wide:

(A) Posts should be installed to limit each roadway to sixteen (16) feet wide where straight and eighteen (18) feet wide where curved; and

(B) A row of posts should be set for each five (5) feet of space between the roadway posts and the ribs.

(5) Openings should not be more than thirty (30) feet wide.

(c) Installation of roof support using mining machines with integral roof bolters.

(1) Before an intersection or pillar split is started, roof bolts should be installed on at least five (5)- foot centers where the work is performed.

(2) Where the roof is supported by only two (2) roof bolts crosswise, openings should not be more than sixteen (16) feet wide.

(d) Pillar Recovery.

(1) During development, any dimension of a pillar should be at least twenty (20) feet.

(2) Pillar splits and lifts should not be more than twenty (20) feet wide.

(3) Breaker posts should be installed on not more than four (4)- foot centers.

(4) Roadside-radius (turn) posts, or equivalent support, should be installed on not more than four (4)- foot centers leading into each pillar split or lift.

(5) Before full pillar recovery is started in areas where roof bolts are used as the only means of roof support and openings are more than sixteen (16) feet wide, at least one (1) row of posts should be installed to limit the roadway width to sixteen (16) feet. These posts should be:

(A) Extended from the entrance to the split through the intersection outby the pillar in which the split or lift is being made; and

(B) Spaced on not more than five (5)- foot centers.

(e) Unsupported openings at intersections. Openings that create an intersection should be permanently supported or at least one (1) row of temporary supports should be installed on not more than five (5)-foot centers across the opening before any other work or travel in the intersection.

(f) Longwall mining systems.

(1) Systematic supplemental support should be installed throughout:

(A) The tailgate entry of the first longwall panel prior to any mining; and

(B) In the proposed tailgate entry of each subsequent panel in advance of the frontal abutment stresses of the panel being mined.

(2) When a ground failure prevents travel out of the section through the tailgate side of the longwall section, the roof control plan should address:

(A) Notification of miners that the travelway is blocked;

(B) Re-instruction of miners regarding escapeways and escape procedures in the event of an emergency;

(C) Re-instruction of miners on the availability and use of self-contained self-rescue devices or self rescuers;

(D) Monitoring and evaluation of the air entering the longwall section;

(E) Location and effectiveness of the two-way communication systems; and

(F) A means of transportation from the section to the main line.

(3) The plan provisions addressed by paragraph (g)(2) of this section should remain in effect until a travelway is reestablished on the tailgate side of a longwall section.

(4) Sections 6 through 13 set out the criteria by which the Director of the Division of Health, Safety and Training will be guided in approving roof control plans on a mine-by-mine basis. Additional measures may be required. Except where otherwise mandated by Court ruling, roof control plans which do not conform to these criteria may be approved providing the operator can satisfy the Director of the Division of Health, Safety and Training that the resultant roof conditions will provide no less than the same measure of protection to the miners.

38-10-19 Evaluation and revision of roof control plan.

(a) Revisions of the roof control plan shall be proposed by the operator:

(1) When conditions indicate that the plan is not suitable for controlling the roof, face, ribs, or coal or rock bursts; or

(2) When accident and injury experience at the mine indicate the plan is inadequate. The accident and injury experience at each mine shall be reviewed at least every six (6) months.

(b) Each unplanned roof fall and rib fall and coal or rock burst that occurs in the active workings shall be plotted on a mine map if it:

(1) Is above the anchorage zone where roof bolts are used;

(2) Impairs ventilation;

(3) Impedes passage of persons;

(4) Causes miners to be withdrawn from the area affected; or

(5) Disrupts regular mining activities for more than one (1) hour.

(c) The mine map of which roof falls are plotted shall be available at the mine site for inspection by authorized representatives of the Director of the Division of Health, Safety and Training and representatives of miners at the mine.

(d) The roof control plan for each mine shall be reviewed every six (6) months by an authorized representative of the Director of the Division of Health, Safety and Training. This review shall take into consideration any falls of the roof, face, and ribs and the adequacy of the support systems used at the time.

38-10-20 Criteria-Full Roof Bolting Plan. A full roof bolting plan is one in which roof bolts constitute the sole means of roof support at a face as part of the normal mining cycle.

(a) Roof bolt assemblies should meet the following specifications:

(1) All components of the roof bolt assembly should comply with the American National Standards Institute, "Specifications for Roof Bolting Materials in Coal Mines".

(2) Roof bolts that provide support by creating a beam of laminated strata should be of a length that assures adequate anchorage, but in no case should the length of the bolt be less than thirty (30) inches.

(3) Roof bolts that provide support by suspending the immediate roof from a stronger overlying strata should be of a length that permits anchoring at least twelve (12) inches in the stronger strata.

(4) Bearing plates used directly against the mine roof should be not less than six (6) inches square or of equivalent

area. In exceptional cases where the mine roof is firm and not susceptible to sloughing, bearing plates five (5) inches square or of equivalent area may be used.

(5) When wooden material such as planks, header blocks, and crossbars are used between the bearing plate and the roof for additional bearing, the use should be limited to short life openings (not to exceed three (3) years) unless treated. Bearing plates used in conjunction with wooden materials should be not less than four (4) inches square or of equivalent area.

(6) When washers are used, the shape of such washers should conform to the shape of the roof bolt head and the shape of the bearing plate and such washers should be of sufficient strength to withstand loads up to the yield point of the roof bolt.

(b) Installation practices:

(1) Finishing bits should be easily identifiable by sight or feel and the diameter should be within a tolerance of plus 0.030-inch minus zero of the manufacturers recommended hole diameter for the anchor used.

(2) Torque ranges specified in the roof control plan should be capable of providing roof bolt loads to within plus or minus 1,000 pounds of fifty (50) percent of either the yield point of the roof bolt being used or the anchorage capacity of the strata, whichever is less. In no case, however, should installed torques provide loads that exceed the yield point of the roof bolt being used or the anchorage capacity. Relationship for determining roof bolt load for torque applied are as follows:

Cone Neck or Self-Centering Roof Bolt

5/8-inch expansion type roof bolt--
30 lbs. of load per ft.-lb. of torque.

3/4-inch expansion type roof bolt--
30 lbs. of load per ft.-lb. of torque.

Standard Roof Bolt Without Hard Washer or Lubricant

5/8-inch expansion type roof bolt--
50 lbs. of load per ft.-lb. of torque.

3/4-inch expansion type roof bolt--
40 lbs. of load per ft.-lb. of torque.

Standard Roof Bolt With Hard Washer or Lubricant

5/8-inch expansion type roof bolt--
60 lbs. of load per ft.-lb. of torque.

3/4-inch expansion type roof bolt--
60 lbs. of load per ft.-lb. of torque.

(3) Each operator should outline and describe roof bolt testing procedures to be followed in the roof control plan. The procedures to be followed should include:

(A) Providing and maintaining an approved, calibrated torque wrench on each roof bolting machine. An approved wrench should be one that will indicate the actual torque on the roof bolt.

(B) Designating a qualified person to spot-check torques on at least twenty-five (25) percent of the roof bolts immediately after the working place has been fully bolted. If the majority of the installed torques fall outside the recommended range, the remaining roof bolts in the working place should be tested. If the majority of the torques still fall outside the recommended range, necessary adjustments in the equipment used for tightening the roof bolts should be made immediately. If, after adjustments are made and required torques are not achieved, supplementary support such as additional roof bolts, longer roof bolts with adequate anchorage, posts, cribs, or crossbars should be installed.

(C) On a daily basis, spot-check torques on at least ten (10) percent of the roof bolts from the outby corner of the last open crosscut to the face and record the results. This record should show the number of roof bolts tested, number of roof bolts below the recommended range, and the number of roof bolts above the recommended range. If results show that a majority of the roof bolts are not maintaining at least seventy (70) percent of the minimum torque required (fifty (50) percent if plates bear against wood), or have exceeded the maximum required torque by fifty (50) percent, supplementary support such

as additional roof bolts, longer roof bolts with adequate anchorage, posts, cribs, or crossbars should be installed until a review of the adequacy of the roof control plan is made by an authorized representative of the Director of the Division of Health, Safety and Training.

(4) Devices should be used to compensate for the angle when roof bolts are installed at angles greater than 5° from the perpendicular to the roof line.

(c) Roof bolting pattern:

(1) Roof bolt spacing either lengthwise or crosswise should not exceed five (5) feet.

(2) Roof bolts should be installed as close as possible to, but not more than five (5) feet from, the face before starting conventional cutting or a continuous miner run.

(3) Roof bolts should be installed as close as possible to, but not more than five (5) feet from, the face before starting conventional cutting or a continuous miner run.

(d) Openings should not exceed twenty (20) feet in width where roof bolting is the sole means of roof support.

38-10-21 Criteria -- Conventional Roof Control Plan. A conventional roof control plan is one in which installation of materials other than roof bolts such as metal or wood posts, jacks, or cribs in conjunction with wooden cap blocks (half headers), footers (sills), planks and beams are installed as the sole means of roof support at a face as part of the normal mining cycle.

(a) Support materials should meet the following specifications:

(1) Posts should be of solid, straight grain wood with the ends sawed square and free from defects which would affect their strength.

(2) The diameter of round posts should not be less than one (1) inch for each fifteen (15) inches of length, but in no case should the diameter be less than four (4) inches; split posts should have a cross-sectional area equal to that required for round posts to equivalent length.

(3) Wooden cap blocks and footers should have flat paralleled sides and be not less than two (2) inches thick, four (4) inches wide, and twelve (12) inches long.

(4) Wooden crossbars and planks should be straight and of solid wood. Crossbars should have a minimum cross-sectional area of twenty-four (24) square inches and the minimum thickness should be three (3) inches. Planks should have a minimum cross-sectional area of eight (8) square inches and a minimum thickness of one (1) inch.

(5) Cribbing material should be of wood having parallel flat sides. In no case should the crib be less than thirty (30) inches square.

(b) Installation practices:

(1) No more than two (2) wooden wedges should be used to install a post.

(2) Posts should not be installed under roof susceptible to sloughing or under disturbed roof without a wooden cap block, plank, or crossbar between the post and the roof.

(3) Posts should be installed tight and on solid footing.

(4) Blocks used for lagging between the roof and wooden crossbars, planks, or metal bars should be spaced so that the load on the supports will be equally distributed.

(5) Cap blocks should be used between jacks and the roof.

(c) Conventional support pattern:

(1) Spacing of roadway roof supports should not exceed five (5) feet.

(2) Width of roadways should not exceed fourteen (14) feet on the straight and sixteen (16) on the curves.

(3) Roof supports should be installed to within five (5) feet of the uncut face; however, the supports nearest the face may be removed to facilitate the operation of face equipment if equivalent temporary support is installed prior to removal.

(4) When an opening is no longer needed for storing supplies or for travel of equipment, the roof at the entrance of all such openings along travelways should be supported by extending the post line across the opening.

(d) Openings should not exceed twenty (20) feet in width where the roof is supported solely by conventional means.

38-10-22 Criteria--Combination Roof Control Plan. For a plan where both roof bolts and conventional supports are used for roof control at the face, the criteria for a Full Roof Bolting Plan and a Conventional Roof Control Plan should apply with the following modifications:

(a) Any place being driven over twenty (20) feet in width should be supported by a Combination Roof Control Plan.

(b) The roadway should be limited to sixteen (16) feet in width on both the straight and the curves to within ten (10) feet of the uncut face.

(c) A row of posts should be set for each five (5) feet of space between the roadway posts and the ribs.

(d) Openings should not exceed thirty (30) feet in width.

38-10-23 Criteria--Spot Roof Bolting Plan. Spot roof bolting may be used only as a supplement to the approved roof control plan at random locations where adverse roof conditions are encountered. Where spot roof bolting is used, the criteria in Section 11 (a) and (b) of the Full Roof Bolting Plan should apply. In addition, roof bolts should be installed in accordance with roof conditions, but in no case should spacing exceed four (4) feet lengthwise and crosswise. Roof bolting should begin under safe roof and continue for the length of the adverse roof condition until safe roof is again encountered.

38-10-24 Criteria--Pillar Recovery Plan. Any reduction in pillar size during second mining shall be considered pillar recovery. Second mining is construed to be intentional retreat mining. The following criteria are applicable to pillar recovery roof control plans:

(a) Sections 11, 12, and 13 should apply depending on whether the pillar recovery plan calls for conventional support or a combination of conventional support and roof bolting.

(b) During development, the size and shape of the pillars should be dictated by the depth of cover, height of coal and other conditions associated with the coalbed. The smallest dimension of the pillar should be no less than twenty (20) feet.

(c) Pillar splits and lifts should not exceed twenty (20) feet in width.

(d) A minimum of two (2) rows of breaker posts or the equivalent should be installed on not more than four (4)-foot centers across each opening leading into pillared areas and such posts should be installed before production is started. Such posts should be installed near the breakline between the lift being started and the gob.

(e) A row of roadside-radium (turn) posts or the equivalent should be installed on not more than four (4)- foot centers leading into pillar splits, including secondary splits in slabs, wings or fenders.

(f) The width of the roadway leading from the solid pillars to a final stump (pushout) should not exceed fourteen (14) feet. At least two (2) rows of posts or their equivalent should be set on each side of the roadway on not more than four (4)- foot centers. Only one open roadway leading to a final stump (pushout) should be permitted.

(g) Before full pillar recovery is begun in areas where roof bolts were used as the sole means of roof support and openings are more than sixteen (16) feet wide, supplementary support should be installed. Supplementary supports should consist of at least one (1) row of posts installed on either side on not more than four (4)-foot centers lengthwise and limit the width of all roadways to sixteen (16) feet. These supports should be extended from the entrance to the split for at least one (1) full pillar outby the pillar in which the split is being made.

(h) The following criteria should apply to open end pillaring:

(1) At least two (2) rows of breaker posts or their equivalent should be installed between the lift being started and the gob on not more than four (4)-foot centers before the initial cut is made and should be extended to within seven (7) feet of the face. The width of the roadway should not exceed fourteen (14) feet.

(2) If the roof in open end pillaring has a tendency to hang, falls should be made, or cribs installed in addition to the breakline posts between the active lift and the hanging area. The cribs should be set not more than eight (8) feet apart. Heavy duty hydraulic jacks set at centers close enough to give equivalent support may be substituted for cribs, if such jacks are removed remotely.