FIRST CLASS MINE FOREMAN

CERTIFICATION STUDY GUIDE

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Commonwealth of Virginia

Virginia Department of Energy

Coal Mine Safety Program

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STUDY GUIDE DISCLAIMER

Article 1 of the **Coal Mine Safety Laws of Virginia** establishes requirements for certification of coal mine workers. The certification requirements are included in §45.2-515. through §45.2-534. in which the Board of Coal Mining Examiners is established for the purpose of administering the certification program. The Board has promulgated certification regulations 4 VAC 25-20, which set the minimum standards and procedures required for Virginia coal miner examinations and certifications.

The Virginia Department of Energy's Coal Mine Safety team developed this study guide to better assist coal miners seeking certifications. The material included is not all-inclusive and should only be considered an aid in obtaining knowledge of the mining practices, conditions, laws and regulations. This guide is based upon the Coal Mining Safety Laws of Virginia, Safety and Health Regulations for Coal Mines in Virginia, Title 30 Code of Federal Regulations (30 CFR), State and Federal Program Policy Manuals and other available publications. Nothing herein should be construed as recommending any manufacturer's products.

The study guide and materials are available through the Virginia Department of Energy. Each guide is available for download via the agency's website at www.energy.virginia.gov and printed copies are kept at Virginia Energy's Big Stone Gap office for purchase. Any questions concerning material in the study guide should be addressed to the Regulatory Boards Administrator at the Big Stone Gap Office.

TABLE OF CONTENTS

SECTION 1—RECORDS, PERMITS AND APPROVALS

1. Q. What is necessary to open a mine?
   A. A license to operate a mine from Virginia Energy's Coal Mine Safety.

§45.2-535.

2. Q. How often must a mine license be renewed?
   A. Renewed annually by the anniversary date of the license acquisition.

§45.2-535.

3. Q. What shall be prescribed by the Chief, Coal Mine Safety for systematic support of the mine roof?
   A. A roof control plan, which contains minimum standards.

§45.2-710.A.

4. Q. What is required before coal can be removed within 200 feet of an oil or gas well?
   A. Written approval by the Chief.

§45.2-707.B.

5. Q. What is required to use non-permissible blasting devices?
   A. In accordance with a plan approved by the Chief or unless firing is done from the surface when all persons are out of the mine

§45.2-722.B.2

6. Q. What is required to shoot coal from the solid?
   A. A permit approved by the Chief.

§45.2-722.C.

7. Q. Who must prescribe the number of persons allowed to ride in a hoist cage or car?
   A. The Manufacturer.

§45.2-742.D.

8. Q. What is required in relation to two travel ways from the mine?
   A. Until two travel ways are available, not more than 20 miners shall work underground.

§45.2-728.

9. Q. In relation to evacuation procedures, what must be posted on the surface and underground to indicate escape routes?
   A. An emergency response plan approved by the Chief, which includes the fire communication plan, evacuation procedures, waterlines, numbering system for brattices and escapeways.

§45.2-820.A.

10. Q. What is required to use diesel powered equipment in underground coal mines?
    A. Written approval from the Chief.

§45.2-824.

11. Q. How shall main fans be operated?
    A. Continuously, unless written permission is granted by the Chief for planned stoppages.

§45.2-833.G.

12. Q. What is required for the ventilation of worked out areas?
    A. A bleeder system plan approved by the Chief.

§45.2-837.A.

13. Q. What is required to establish bleeder checkpoints?
    A. A bleeder plan approved by the Chief.

§45.2-837.A.

14. Q. Can more than one section be ventilated with the same split of air?
    A. No. Each section is required to be ventilated with a separate split of air.

§45.2-838.E.

15. Q. At what distances shall crosscuts between rooms be provided?
    A. As specified in the approved roof control plan.

§45.2-840.A.

16. Q. What is required prior to sealing abandoned workings?
    A. A sealing plan in accordance with sealing provisions of the approved bleeder plan.

§45.2-845.B.

Notifications

1. Q. All of the following requires 10 days prior notice to the Department.
   A. (a) When an operator intends to discontinue the working of an underground mine.
   (b) When working of an inactive mine is resumed.
   (c) When the mine name changes or the name of the operator changes.
   (d) Opening a new mine.

   §45.2-541.A.

2. Q. What action must be taken if an explosion or mine fire occurs at a mine?
   A. The operator shall notify the Department by the quickest available means.

   §45.2-555.A.

3. Q. What action must be taken if an accident occurs at any mine?
   A. Each operator shall report promptly and the scene of the accident shall not be disturbed pending an investigation.

   §45.2-556.A.

4. Q. What type of accident reports must be kept on file at the mine?
   A. Any accident including lost time and non-lost time injuries.

   §45.2-557.B.

5. Q. What type roof falls shall be reported to the Department?
   A. Any unplanned roof fall at or above the anchorage zone in active workings where roof bolts are in use or an unplanned roof or rib fall in active workings that impairs ventilation or impedes passage.

   §§45.2-556.A. and 45.2-501.

6. Q. Who must be notified if a serious fire which is not extinguished within 30 minutes of discovery occurs at a mine?
   A. The Chief, by the quickest available means.

   §45.2-821.

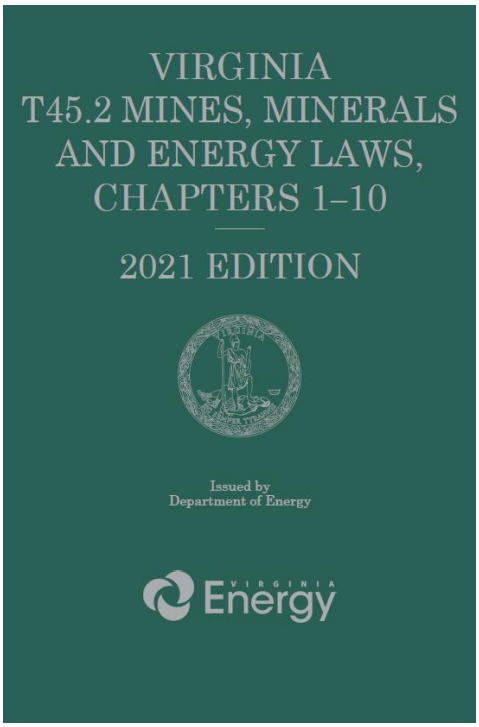
7. Q. What action shall be taken when a hazardous condition cannot be corrected immediately?
   A. Hazardous conditions shall be corrected immediately; if the condition creates an imminent danger, everyone, except those persons necessary to correct the hazardous condition, shall be withdrawn from the affected area.

   §45.2-828.E.

SECTION 2—QUALIFICATIONS AND DUTIES OF THE FIRST CLASS MINE FOREMAN

Chapters 5 through 9 of the Coal Mine Safety Laws of Virginia deal directly with the mining industry, and every First Class Mine Foreman should be familiar with the general content of those laws. The purpose of the Coal Mine Safety Laws of Virginia is to provide reasonable laws to promote the safety and health of those engaged in the mining of coal; the intent is to provide protection and preserve property.

Within those laws are found official definitions of common terms, qualifications and duties of First Class Mine Foremen (as well as those of the Chief, inspectors, Board of Coal Mining Examiners, and others), examination and certification requirements for various tasks, rules and standards for mine rescue and first-aid stations, explosives and blasting, main fans, electricity, fire prevention, etc. This section contains questions and answers pertaining to qualifications and duties of the First Class Mine Foreman.



BOARD OF COAL MINE EXAMINERS
CERTIFICATION REQUIREMENTS
https://energy.virginia.gov/coal/coal-mine-safety/coalsafety.shtml

Article 3 of the **Coal Mine Safety Laws of Virginia** establishes requirements for certification of coal mine workers. The certification requirements are included in §45.2-515. through §45.2-534. in which the Board of Coal Mining Examiners is established for the purpose of administering the certification program. The Board has promulgated certification regulations 4 VAC 25-20, which set the minimum standards and procedures required for Virginia coal miner examinations and certifications.

CERTIFICATION CLASSIFICATION: ***First Class Mine Foreman***

This certification authorizes the holder to:

- Perform all duties required by State and Federal Laws and Codes as certified mine foreman/examiner
- Record findings of Pre-shift, On-shift and Weekly Examinations

NOTE:

- This certification may be used to perform Pre/shift – On/shift Examinations at shaft/slope locations.
- This certification meets requirements for General Coal Miner certification

APPLICATION/EXPERIENCE REQUIREMENTS:

- Application (BCME-1) and $40.00 fee 5 working days prior to examination
- 23 years of age
- Five years mining experience, three of which shall be underground
- Three years credit will be granted for mining engineering degree from an approved four year college or two years credit for a degree in mining technology
- Current first aid training (MSHA first aid 5000-23 acceptable)

EXAMINATION REQUIREMENTS: A score of 85% on each element of the examination

ELEMENTS OF EXAM	NUMBER OF QUESTIONS
Dust (DU)	20
Electrical (EL)	20
Explosives (EX)	20
Fires and Explosions (FX)	20
Haulage (HA)	20
Mine Gases (MG)	20
Mining Laws (ML)	50
Ventilation (VE)	25
Federal Regulations (FR)	25

- Records – Pre-shift/On-shift (PO)
- Records - Practical Exercises (PS)
  - Anemometer
- Map - Ventilated per instructions (MA)
- Records – Weekly Examination (WE)
- Gas Detection Practical demonstration

RECOMMENDED REFERENCE/STUDY MATERIALS:

- Title 30 CFR Parts 48, 70, 75
- Coal Mine Safety Laws of Virginia
- BCME Requirements
- Practical Map and Records
- First Class Mine Foreman Study Guide
- Mine Gases Packet

The above mentioned study materials are available at the Virginia Energy's Big Stone Gap Office, Customer Assistance Center (276) 523-8100.

***4 hours of biannual continuing education is required to update this certification.**

Qualifications and Duties of the First Class Mine Foreman

1. Q. How does a person secure a First Class Mine Foreman certificate?
   A. By passing an examination authorized by the Board of Coal Mining Examiners.

§45.2-520.A.

2. Q. What score is required on each subject of the written examination, including the map and gas examination?
   A. Eighty-five percent (85%).

§45.2-531.C.

3. Q. What condition requires that a First Class Mine foreman be employed?
   A. A First Class Mine Foreman must be employed in every mine where three or more persons work during a 24-hour period.

§45.2-531.A.

4. Q. How much practical experience must an applicant have to become certified as a First Class Mine Foreman?
   A. Five years practical mining experience, with a minimum of three years underground.

§45.2-531.C.

5. Q. What is the minimum age requirement of a First Class Mine Foreman?
   A. A First Class Mine Foreman shall not be less than 23 years of age.

§45.2-531.C.

6. Q. What is the penalty if a mine foreman or any other person is convicted of willfully violating any provisions of the Coal Mine Safety Laws of Virginia or any regulation associated with such laws?
   A. A Class 1 misdemeanor.

§45.2-572.

7. Q. If for any reason the operator fails to provide an ample supply of suitable materials to preserve the safety of employees, what shall be done by the First Class Mine Foreman?
   A. The First Class Mine Foreman shall withdraw all people from the mine, or the portion affected, until such materials or supplies are provided.

§45.2-714.A.

8. Q. What should the mine foreman do when hazardous conditions are found in the mine?
   A. The mine foreman shall post a conspicuous “Danger” sign at each entrance where the danger exists.

§45.2-826.F.

9. Q. How must the mine foreman certify that all working places have been examined during Pre-shift examinations?
   A. Initials, date, and time shall be placed at each working place examined.

§45.2-826.G.

10. Q. In a multiple shift operation, can a certified First Class Mine Foreman make the Pre-shift examination for the next or succeeding shift?
    A. Yes.

§45.2-826.K.

11. Q. Who is the superior to the mine foreman in the performance of Pre-shift examinations?
    A. No one is superior to the mine foreman in performing Pre-shift examinations.

§45.2-826.M.

12. Q. How often shall a certified person (mine foreman) examine each underground section where coal is produced and other areas where mining equipment is being installed or removed?
    A. At least once each shift and more often if necessary.

§45.2-827.A.

13. Q. How often shall underground belt conveyor entries be examined when such belts are operated during coal production?
    A. At least once each shift.

§45.2B-827.A.

14. Q. When shall idle or worked out areas of any mine, including section belts that have been idle for a period of twenty-four (24) hours, be examined by a certified person before other employees are permitted to enter or work in such areas?
    A. Immediately before anyone enters such areas.

§45.2-827.E.

15. Q. What must be done when any hazardous condition exists at the mine that cannot be corrected immediately?
    A. Everyone except persons necessary to correct the hazardous condition shall be withdrawn from the affected area.

§45.2-828.E.

16. Q. How often shall the First Class Mine Foreman travel and examine unsealed worked out areas where no pillars have been recovered?
    A. At least every seven days.

§45.2-828.A.

17. Q. What shall a mine foreman do with the results of Pre-shift examinations?
    A. Return to the surface or a designated station underground and report in person with the results of such examinations to an authorized person on the surface. Immediately upon reaching the surface, such mine foreman shall record in ink or indelible pencil the results of his inspection in a book kept on the surface for that purpose.

§45.2-830.B.

18. Q. Who shall read and countersign promptly the daily and weekly reports of certified persons covering the examinations for dangerous conditions?
    A. Records shall be countersigned by the supervisor of the examiner creating the records.

§45.2-830.F.

19. Q. What is the responsibility of a First Class Mine Foreman in relation to the Coal Mine Safety Laws of Virginia?
    A. To ensure compliance at all times with the Coal Mine Safety Laws of Virginia that pertain to his duties and the health and safety of all miners.

§45.2-703.A.

20. Q. How must the First Class Foreman instruct new employees?
    A. Every new miner must be aware of all hazardous conditions associated with the work environment and furnished with a copy of the mining laws and company rules.

§45.2-575.A.

21. Q. Is a First Class Mine Foreman required to furnish his workers with a copy of the Mine Safety Laws of Virginia?
    A. Yes.

§45.2-575.A.

22. Q. How long shall an inexperienced underground miner be required to work with an experienced underground miner?
    A. At least six months.

§45.2-705.A.

SECTION 3 - GENERAL INFORMATION, PRACTICES AND LAWS

Coal is a decomposed vegetable matter that has been subjected to pressure and moisture (without free access to air) over thousands of years. Its value is measured in terms of carbon content, moisture content, existence of undesirable elements, and weight per cubic foot.

Safety practices in Virginia mines are mandated by the Coal Mine Safety Laws of Virginia. Safety and standard operation procedures and practices are established within the framework of safety rules and regulations. Safety meetings are recommended to promote the free exchange of suggestions and ideas for recognition and elimination of safety hazards.

An understanding of the definitions of drift, shaft and slope, and the nature of hoisting operations are important to the mine foreman. The use of a hoist is an important subject, and the mine foreman must be concerned with who may operate a hoist. All hoists must be equipped with safety devices, properly maintained and inspected, and operated in accordance with standard signal codes.

An understanding of mining methods requires knowledge of mine layout, rooms, pillars, floor, panel systems, and multiple entry systems, as well as the advantages of each type of system. Squeezes, creeps, falls and bumps are undesirable and should be avoided or corrected by proper placement or extraction of pillars. Proper installation of roof supports and mining methods are important factors in controlling the roof and ribs.

Roof falls (or the absence of adequate roof control) are a major cause of mining accidents and mining fatalities. The roof requires constant support, and it must be inspected, evaluated and tested in accordance with State and Federal laws and accepted rules and practices.

Coal

1. Q. What is the general accepted theory for the origin of coal?
   A. It is the product of partial to complete decomposition of vegetable matter in the absence of oxygen.

   Dictionary of Mining Terms

2. Q. What are the general ingredients of coal?
   A. Water, fixed carbon, sulfur, volatile carbon compounds, oxygen, and ash.

   Dictionary of Mining Terms

3. Q. What are the principle heat-producing constituents of coal?
   A. Fixed carbon and volatile matter.

   Dictionary of Mining Terms

4. Q. What is volatile matter in coal?
   A. Substances that are readily gasified by increased temperature.

Dictionary of Mining Terms

5. Q. What is ash?
   A. That portion of coal other than moisture that will not burn.

Dictionary of Mining Terms

6. Q. What undesirable elements exist in coal in varying small quantities?
   A. Sulfur and phosphorus.

Dictionary of Mining Terms

7. Q. Why is sulfur undesirable in coal?
   A. It corrodes metal when burned, often causes clinkers, and affects the quality of iron when coke-containing sulfur is used.

Dictionary of Mining Terms

8. Q. What is the general specific gravity of Virginia coals?
   A. Approximately 1.30.

Dictionary of Mining Terms

9. Q. What is the average weight of solid coal per cubic foot?
   A. Approximately 80 pounds.

Dictionary of Mining Terms

10. Q. What is a B.T.U.?
    A. British Thermal Unit: the quantity of heat required to raise the temperature of one pound of water one degree Fahrenheit.

Webster's Dictionary

11. Q. How is the heating value of coal usually expressed?
    A. By the number of B.T.U.'s per pound of coal.

Webster's Dictionary

General Safety Practices

1. Q. Why were the Coal Mine Safety Laws of Virginia enacted?
   A. To protect the safety and health of all miners.

§45.2-502.

2. Q. What types of beverages or drugs shall not be taken into a mine?
   A. Intoxicating liquors or controlled drugs without the prescription of a licensed physician.

§45.2-505.A.

3. Q. How shall the scene of a serious or fatal accident be left?
   A. The scene shall be left unchanged pending an investigation.

§45.2-556.A.

4. Q. What shall be available at all times for the proper maintenance of the mine?
   A. Suitable materials of proper size to secure all roof, ribs and faces of working places.

§45.2-714.A.

5. Q. What shall be done in each advancing working place that is within fifty feet of abandoned areas?
   A. Boreholes should be kept not less than ten feet in advance of the face and, not more than 8 feet apart unless otherwise approved by the Chief.

§45.2-708.A.

6. Q. How far from abandoned areas shall boreholes be started?
   A. When within 50 feet of abandoned workings in such mine, as shown by surveys made and certified by a registered engineer or surveyor or within 200 feet of abandoned areas in such mine which have not been certified as surveyed, or within 200 feet of any other abandoned area of an adjacent mine that cannot be Pre-shifted.

§45.2-708.A.

7. Q. What protective device shall be provided for cutter chains of mining machines while such machines are parked or being trammed?
   A. Locking devices secured by mechanical means or electrical interlocks.

§45.2-800.A

8. Q. When equipment is in operation or is being trammed, where shall personnel be located?
   A. No miner shall position himself or be permitted in a pinch point between equipment and the face or ribs of the mine, or another piece of equipment.

§45.2-800.D.

9. Q. What precautions shall be taken while remote control machines are being trammed between work areas?
   A. Machine operators shall make sure all persons are in the clear and operate the machine at a safe speed and no miner shall position himself or be permitted in a pinch point between such equipment and the face or ribs of the mine or another piece of equipment.

§45.2-800.D.

10. Q. What protective devices shall be used on gears, sprockets, pulleys, etc.?
    A. Suitable guards shall be provided.

§45.2-801.A.1.

11. Q. What protective devices shall be provided for openings in floors, ground and repair pits?
    A. Guards shall be kept in place.

§45.2-801.A.6.

12. Q. What precautions should be observed during re-assembly of a machine having dangerous contacts or moving parts?
    A. All guards or safety devices shall be replaced before the machine is put back in operation.

§45.2-801.C.

13. Q. Why should loose rock, loose coal or other materials be prohibited from accumulating along the clearance space on all track haulage roads?
    A. Obstructions or lack of clearance may result in serious injury.

§45.2-746.D.

14. Q. How shall mine equipment be maintained?
    A. Maintained in a safe operating condition.

§45.2-751.

15. Q. What shall be done with defective transportation equipment?
    A. All defects found shall be corrected or the equipment removal from service.

§45.2-750

16. Q. What is the principal danger with using lifting jacks?
    A. The machine may slip off the jack and fall on a worker or the jack and bar may "kick-out", causing injury to individuals. All track-mounted equipment shall be equipped with proper lifting devices.

§45.2-752.B.

17. Q. How can lifting jack hazards be avoided?
    A. By blocking the machine properly as it is raised by the lifting jack and using proper lifting devices.

§45.B2-752.B.

18. Q. What is a common cause of serious injuries to persons working with moving equipment?
    A. Getting on, off, or in the path of moving equipment. Miners shall not board or leave moving man-trip cars.

§45.2-761.F.

19. Q. How should hoisting wire ropes be maintained?
    A. Free from worn and broken strands, well lubricated and in a safe operating condition.

§45.2-743.

20. Q. How should hoists, ropes, cages and other hoisting equipment be maintained?
    A. Maintained in a safe operating condition.

§45.2-743.

21. Q. What is the safety factor of hoist ropes used to lower miners?
    A. A safety factor of 10 to 1.

§45.2-736.A.

22. Q. What signs of weakness are likely to be present in a worn or defective hoisting rope?
    A. A decrease in the diameter of the rope and the appearance of broken wires.

§45.2-743.

23. Q. When moving a work deck or platform, what must be worn?
    A. Safety belts secured on all miners working thereon.

§45.2-742.B.

24. Q. When two travel ways have not been developed and work is in progress to provide a second travel way, how many miners shall be permitted underground at one time in the mine?
    A. Not more than twenty.

§45.2-728.

25. Q. How shall travel ways or escapeways be marked?
    A. By direction signs conspicuously posted at all points where travel ways and escapeways are intersected by other travel ways.

§45.2-730.A.

26. Q. In which entry should the continuous lifeline be located?
    A. In the primary designated intake escapeway.

§45.2-730.B.

27. Q. How far must the continuous lifeline extend in the primary designated escapeway?
    A. From the bottom of the shaft or the surface up to the section loading point or such other point that may be approved.

§45.2-730.B.

28. Q. What regulation shall be placed on miners entering and leaving the mine?
    A. A personnel-checking system shall be used for checking miners in and out of mines.

§45.2-853.A.

29. Q. How shall miners be checked in and out of mines?
    A. A check-in and check-out system shall be adopted that will provide positive identification, on the person, of every individual underground. An accurate record of the miners in the mine shall be kept in a place that will not be affected in the event of a mine explosion.

§45.2-853.A.1,2

30. Q. Who shall institute a smoker's search plan?
    A. The mine operator.

§45.2-856.B.

31. Q. Who must approve the smoker's search plan?
    A. The Chief.

§45.2-856.B.

32. Q. What is the purpose of the smoker's search program?
    A. To ensure that any person entering the underground area of a mine does not carry smoker's articles or materials used for igniting smoker's articles.

§45.2-856.B.

33. Q. What is the penalty for any person convicted of possessing smoker's articles underground?
    A. A Class 6 felony.

§45.2-856.A.

34. Q. What is the penalty for any operator, agent, or mine foreman convicted of knowingly permitting any person in a underground coal mine to smoke, carry, or possess any smoker's articles or materials used for igniting smoker's articles?
    A. A Class 6 felony.

§45.2-857.A.

35. Q. How can the danger from revolving machinery parts and continuous miner ripper heads be avoided?
    A. All power circuits and electrical equipment shall be de-energized, locked out and tagged before repairs are made.

§45.2-815.A.

37. Q. Who shall develop the emergency response plan?
    A. The mine operator.

§45.2-820.A.

38. Q. What information must be provided in the emergency response plan?
    A. A fire communication plan, evacuation procedures, the identification of water lines, the numbering system of brattices, the location of escapeways and such other information relating to fire evacuation planning as the Chief may require.

§45.2-820.A.

39. Q. Who shall maintain a list of the next of kin of all miners employed at the mine?
    A. The mine operator.

§45.2-820.F.

40. Q. Where shall the list of the next of kin be kept?
    A. At the mine site or central facility, readily accessible to the mine.

§45.2-820.F.

41. Q. Who shall approve the emergency response plan?
    A. The Chief .

§45.2-820.B.

42. Q. Where shall the emergency response plan be posted?
    A. In a conspicuous place, readily accessible to all miners underground, and on the surface of the mine.

§45.2-820.C.

43. Q. Who shall train miners in the implementation of the emergency response plan?
    A. The mine operator.

§45.2-820.D.

44. Q. Who is responsible for implementing practice drills of the emergency response plan?
    A. The mine operator.

§45.2-820.D.

45. Q. What shall be done with the dates and times of practice drills associated with the emergency response plan?
    A. The dates and times shall be recorded in the emergency response plan.

§45.2-820.D.

46. Q. What shall be available to all persons who travel underground?
    A. A one hour self-contained self-rescue device.

§45.2-820.E.

47. Q. How shall oil, grease and flammable hydraulic fluid be kept underground for current use?
    A. In closed metal containers.

§45.2-823.B.

48. Q. What shall be done before welders or torches are used in a mine?
    A. A competent person shall check for gas with a permissible methane detection device and fire-extinguishing agents shall be immediately available.

§45.2-825.B.

49. Q. What shall be done before welders or torches are used in a mine?
    A. Tests for methane shall be conducted, rock dust or suitable fire extinguishers shall be immediately available and welding operations shall be performed only in well-ventilated areas under the direct instructions of a certified person.

§45.2-825.B.

50. Q. When may persons designated by the operator go past danger signs?
    A. Only in case of necessity to correct or evaluate the condition.

§45.2-826.F.

51. Q. What shall be done at entrances to an area with hazardous conditions?
    A. Entrances to an area, which has hazardous conditions, shall be posted or "dangered off" with a conspicuous "DANGER" sign.

§45.2-826.F.

52. Q. What shall be done before employees are permitted to enter idle or worked out areas underground?
    A. The areas shall be examined for hazardous conditions by a mine foreman immediately before employees enter.

§45.2-826.H.

53. Q. How often shall the mine foreman or his assistant visit and carefully examine each underground working section?
    A. At least once each shift, and more often if necessary, a certified person shall examine for hazardous conditions.

§45.2-827.A.

54. Q. What is the duty of a certified person or authorized person in working places while cutting, drilling or mechanical loading?

A. Test for methane at not more than twenty minute intervals while the machine is in operation.

§45.2-827.D.

55. Q. How often shall airways be traveled and examined?
A. At least every seven days by a mine foreman.

§45.2-828.C.1.2

56. Q. How often shall entrances to unsealed worked out areas be examined?
A. At least every seven days.

§45.2-828.A.

57. Q. What shall be done when hazardous conditions are reported?
A. Hazardous conditions shall be given prompt attention for removal by the mine foreman.

§45.2-831.

58. Q. What instrument shall be carried by a certified person examining abandoned workings?
A. A permissible device capable of detecting methane and oxygen deficiency.

§45.2-847.A.

59. Q. What should not be permitted to accumulate on electrical equipment?
A. Oil, grease, coal dust or other combustible material.

§45.2-764.

60. Q. What material should not be permitted to accumulate within 100 feet of all mine openings?
A. Oil, grease, rubbish, coal dust and combustible materials.

§45.2-766.C.

61. Q. Why should personnel not familiar with equipment be prohibited from operating such equipment?
A. Unfamiliarity may result in injury. Every person employed in a mine must be aware of all hazardous conditions incident to his work in such mine.

§45.2-703.B.

62. Q. Where should illumination be provided and how should it be maintained?
A. It should be maintained in safe operating condition, free from shock and contact hazards. Illumination shall be provided at roads, pathways and walkways used at night.

§45.2-919.A.B.

63. Q. Why should handrails be provided for stairways, elevated platforms, and

elevated runways?

A. To prevent falling.

§45.2-922.A.B.C.

64. Q. What protective devices shall be provided for stairways, landings and elevated platforms?

A. Handrails or guardrails and toe boards, maintained in good condition.

§45.2-922.B.C.

65. Q. Why should oil, grease, rubbish, ice or snow never be permitted to accumulate on steps, landings and platforms.

A. To eliminate the hazards of slipping and falling, which could create a hazard.

§45.2-922.C.

66. Q. How shall stairways, platforms and runways be maintained?

A. In good condition.

§45.2-922.C.

67. Q. What precautions should be taken when machinery and equipment are raised for repairs?

A. They shall be securely blocked.

§45.2-917.H.

Shaft and Slope Hoisting

1. Q. What are the requirements in relation to the qualifications of persons placed in charge of hoist equipment used for lowering or hoisting workers?

   A. They shall be certified, have a minimum of one-year experience and necessary skills to operate the hoist safely. (BCME Regulations)

§45.2-520.C.

2. Q. What safety measure should be taken to guard against injury to miners along haulage roads when moving traffic approaches?

   A. Miners shall take refuge in shelter holes or other places of safety.

§45.2-749.

3. Q. How shall all hoisting equipment be maintained?

   A. In safe operating condition.

§45.2-751.

4. Q. What safety device should be used on trips going up a steep grade?

   A. Effective means to ensure safe control.

§45.2-752.E.

5. Q. What safety devices shall be installed on hoisting equipment to control speed and prevent cages from being carried past the proper landing?
   A. Overspeed and overwind devices, automatic stop controls and emergency safety stop.

§45.2-735.A.

6. Q. What safety device shall be installed on hoisting equipment to provide for positive stopping?
   A. Each hoist should have an adequate braking system capable of stopping and holding a fully loaded unbalanced cage.

§45.2-735.D.

7. Q. What shall be provided on all hoisting equipment that shows the position of a cage or trips within a shaft?
   A. An accurate and reliable indicator.

§45.2-735.E.

8. Q. What safety factor is required for hoist ropes on all trips used to hoist or lower coal materials?
   A. Five to one.

§45.2-736.A.

9. Q. What safety factor is required for hoist ropes on all cages or trips used to transport people?
   A. Ten to one.

§45.2-736.A.

10. Q. How many wraps of rope shall always remain on a hoist drum?
    A. At least (3) three full turns.

§45.2-736.B.

11. Q. What safety devices shall be installed on cages used for hoisting workers?
    A. An approved safety catch, a bridle chain, automatic stopping device, automatic overwind, sufficient cover overhead, adequate brake on the drum, and approved safety gate at the top of the shaft.

§45.2-737.A.

12. Q. What safety device is required for a cage with an unstable self-dump platform used for hoisting or lowering workers?
    A. A locking device.

§45.2-737.A.

13. Q. What safety device shall be installed near the top and at each intermediate landing

of each slope or shaft?

A. A positive-acting stopblocks or derails.

§45.2-755.B.

14. Q. What provision shall be made for the passage of workers from one side of a shaft to the other side?

A. A bypass or "run-around" shall be constructed around the shaft.

§45.2-738.B.

15. Q. What shall be the minimum dimensions of a travel way "run-around" cut around a shaft?

A. Five feet high and three feet wide.

§45.2-738.B.

16. Q. What shall not be allowed to accumulate excessively in a shaft where workers are hoisted or lowered?

A. Ice. §45.2-738.C.

17. Q. What method of communications is required between the top and bottom of a working shaft?

A. Two independent means of signaling.

§45.2-739.A.

18. Q. What are the requirements related to communications between the top and bottom of a working shaft?

A. Two independent means, such as a telephone or other approved means shall be provided.

§45.2-739.A.

19. Q. Where shall hoist signals be posted?

A. At shaft landings and in front of hoisting engineers.

§45.2-739.B.

20. Q. How often shall overwinding devices be tested?

A. At least daily.

§45.2-740.C.

21. Q. When shall a hoisting engineer be on duty?

A. When miners are in the mine, except when automatically operated elevators are used.

§45.2-741.A.

22. Q. Is a hoisting engineer required for automatically operated elevators?

A. No

§45.2-741.C.

23. Q. What precaution shall an engineer in charge of hoisting machinery take to prevent misuse of the machinery?
    A. Permit no interference with any part of the machinery.

§45.2-741.D.

24. Q. What provision is made to protect the engineer or drum runner in the discharge of his duties?
    A. Interference or intimidation from any other person is prohibited.

§45.2-741.D.

25. Q. How often shall safety catches be tested?
    A. At least once each month.

§45.2-740.E.

26. Q. How often are inspections required for hoisting machinery used for lowering or hoisting workers?
    A. Daily.

§45.2-740.F.

27. Q. What shall be the maximum speed of a cage in a shaft or slope used to transport workers?
    A. The maximum speed shall be 1,000 feet per minute.

§45.2-742.A.

28. Q. Who may ride with supplies on a loaded cage or car in any shaft, slope or incline?
    A. No one.

§45.2-742.C.

29. Q. Who shall prescribe the number of persons allowed to ride in any cage or car at one time?
    A. The maximum prescribed by the manufacturer or a lesser number prescribed by the Chief.

§45.2-742.D.

30. Q. Conveyances being lowered into a shaft in which men are working shall be stopped how many feet above the area where such men are working?
    A. At least twenty (20) feet above.

§45.2-742.E.

31. Q. In what condition shall stairs and hoisting machinery in shaft and slope mines be maintained?

A. In safe operating condition.

§45.2-743.

32. Q. How often are surface electrical equipment and wiring required to be inspected?
A. Monthly.

§45.2-814.A.

Mining Methods

1. Q. What may be the result of an irregular pillar line?
A. Pillars not pulled in proper sequence may cause unplanned roof falls and extraction made difficult and dangerous. Roof falls in gob areas relieve weight on the pillars and help stabilize the roof where personnel are required to work.

§45.2-709.B.

2. Q. Why should pillars be extracted in the proper sequence?
A. To obtain adequate falls and prevent excessive weight on standing pillars.

§45.2-709.B.

3. Q. Why should ample pillars be left along haulage ways?
A. To protect from possible squeezes, creeps or roof falls.

§45.2-709.B.

4. Q. What is the panel system?
A. A system in which the coal is mined in panels, with barrier protection between panels.

Dictionary of Mining
Terms

5. Q. What are the practical advantages of the panel system?
A. It provides for better control of ventilation, increases mine safety and guards against squeezes.

MSHA Safety Manual No. 12

6. Q. What is the main consideration in obtaining good falls on a pillar line?
A. To relieve the weight on the pillars and permit their safe and efficient extraction.

Dictionary of Mining
Terms

7. Q. What is a squeeze?
A. The action of excessive weight upon pillars not strong enough to support that weight.

Dictionary of Mining
Terms

8. Q. What is a creep?
   A. The action of an excessive weight upon a weak floor or roof, causing the floor to heave or the roof to sag.

Dictionary of Mining
Terms

9. Q. How can a squeeze be avoided?
   A. By providing pillars of sufficient strength and by obtaining adequate falls by thorough and systematic mining.

Dictionary of Mining Terms

10. Q. How can a creep be stopped?
    A. By rapid extraction of pillars to obtain a break or by leaving pillars of sufficient strength to stop creep.

Dictionary of Mining Terms

11. Q. What is a bump?
    A. Bursting of coal caused by excessive pressure.

Dictionary of Mining Terms

12. Q. What types of underground mining methods are used in Virginia?
    A. Continuous miners, shooting from solid, conventional and longwall.

Safety Manual No. 1

13. Q. What types of surface mining are used in Virginia?
    A. Strip, auger, thin seam and highwall miners.

Safety Manual No. 1

Safety Rules

1. Inspect and test the roof in your work area before beginning work.
2. Take down loose materials.
3. Work from a safe position.
4. Always keep a safe line of retreat.
5. Follow the approved roof control plan.
6. Don’t go beyond permanent roof supports.

7. Don't assume anything is safe.

8. Stay alert to changing mine conditions.

Never enter an area of unsupported roof!

Roof Control

MSHA Safety Manual No. 18

1. Q. What shape does a weak, fragile roof take in an entry after all the loose material has fallen?
   A. The form of an arch.

MSHA Safety Manual No. 18

2. Q. What is used to support the main roof?
   A. (a) Pillars of coal left standing as the coal is extracted;
   (b) Permanent types of support such as roof bolts, cable bolts, etc.;
   (c) Temporary supports i.e. cribs, timbers, etc.

MSHA Safety Manual No. 18

3. Q. What type of roof support is used to tie the strata together?
   A. Roof bolts with expansion shells and bearing plates or roof bolts with a resin-type glue designed for this purpose.

MSHA Safety Manual No. 18

4. Q. What is roof bolting?
   A. A method of supporting the roof by tying the strata together.

MSHA Safety Manual No. 18

5. Q. How can roof falls be controlled?
   A. By careful testing, inspection and systematic support.

MSHA Safety Manual No. 18

6. Q. How can the torque on a roof bolt be measured?
   A. By the use of a properly calibrated torque wrench.

MSHA Safety Manual No. 18

7. Q. What are the main requirements for timbers?
   A. Timbers shall be of proper length, straight grained, of sufficient cross-sectional area, and with ends sawed square.

30CFR 75.222.

8. Q. What shall be the condition of timbers delivered to work areas?
   A. Solid and sound throughout.

MSHA Safety Manual No. 18

9. Q. What shall be furnished in relation to timbers?
   A. A sufficient number of proper length timbers, cap wedges, and cross-bars should be furnished, where required.

MSHA Safety Manual No. 18

10. Q. What are some common errors made while installing timbers?
    A. Setting on uneven surfaces, having too small cap wedges not wedging properly, and using inadequate or crooked timbers.

MSHA Safety Manual No. 18

11. Q. How should a timber be set in a place where the mine floor slopes?
    A. With the top slightly up the slope.

MSHA Safety Manual No. 18

12. Q. What method of roof support could be used when there are numerous fractures in

the roof or the roof is extremely weak?

A. Crossbars or roof straps should be used.

MSHA Safety Manual No. 18

13. Q. What is a crossbar?
    A. A beam to support the roof or attached to the roof.

MSHA Safety Manual No. 18

14. Q. Where must safety posts, jacks or temporary crossbars be set?
    A. At locations where the ATRS is more than 5 feet from the rib.

MSHA Safety Manual No. 18

15. Q. What is the proper method of testing the mine roof?
    A. Tapping with a solid instrument to test by sound and vibration. Perform a visual examination.

MSHA Safety Manual No. 18

16. Q. What mining methods may expose workers to unusual hazards?
    A. Excessive widths of room and entries, faulty pillar recovery methods, inadequate roof control practices.

§45.2-709.B.

17. Q. What shall each mine have in relation to roof control?
    A. An approved roof-control plan prescribed by the Chief.

§45.2-710.A.

18. Q. What shall be done before mining begins in new working places?
    A. Proper roof support shall be provided as prescribed in the approved roof control plan.

§45.2-710.A.

19. Q. What length bolts shall be used in roof bolting?
    A. The minimum length specified in the roof control plan. Longer bolts or other types of bolts may be required to be used when necessary.

§45.2-710.A.

20. Q. What diameter bolts shall be used in roof bolting?
    A. The diameter specified in the roof control plan.

§45.2-710.A.

21. Q. How shall bolts be anchored in roof bolting?
    A. As specified in the roof control plan.

§45.2-710.A.

22. Q. What size plates shall be used in roof bolting?
    A. The size of plates specified in the roof control plan or larger plates when necessary.

§45.2-710.A.

23. Q. How far apart shall bolts be spaced in roof bolting?
    A. As specified in the roof control plan.

§45.2-710.A.

24. Q. What is the installation and evaluation torque range of roof bolts?
    A. As specified in the roof control plan.

§45.2-710.A.

25. Q. Who shall prescribe adequate minimum standards for systematic support suitable to the roof conditions and mining system for each mine?
    A. The Chief, Coal Mine Safety.

§45.2-710.A.

26. Q. What precaution shall be taken by workers prior to starting work?
    A. Examine and test the roof, face and ribs.

§45.2-715.A.

27. Q. During the cutting process, how should machine operators protect themselves from falls of roof?
    A. Frequent examinations should be made and additional supports should be added as needed.

§45.2-715.B.

28. Q. How shall timbers be installed along a trackway?
    A. Such that a proper clearance of a minimum of 24 inches is maintained.

§45.2-746.A.

29. Q. What function of the ATRS must be utilized before any work is performed inby permanent roof supports?
    A. The ATRS shall be placed firmly against the roof and shall remain against the roof while work is being done.

§45.2-713.

30. Q. Where shall the roof control plan be posted?
    A. Conspicuous locations at the mine and a copy shall be available at each working section of the mine.

§45.2-710.D.

31. Q. Who shall instruct all miners in the removal or installation of temporary and permanent roof supports?
    A. The operator or his agent.

§45.2-711.

32. Q. Who shall be instructed in the proper testing of roof, face and ribs?
    A. All workers shall be instructed by the operator or his agent of such mine.

§45.2-715.A.

33. Q. Who shall be furnished with a copy of the approved roof control plan, upon request?
    A. All persons engaged in removing or installing temporary or permanent roof supports.

§45.2-712.

34. Q. What systems are being used to improve the safety of roof bolter operators?
    A. Automated temporary roof support systems (ATRS).

§45.2-713.

35. Q. What protection must be provided for ATRS hydraulic jacks, which support the ATRS?
    A. All hydraulic jacks supporting the ATRS shall have check valves to prevent support failure in the event of sudden loss of hydraulic pressure.

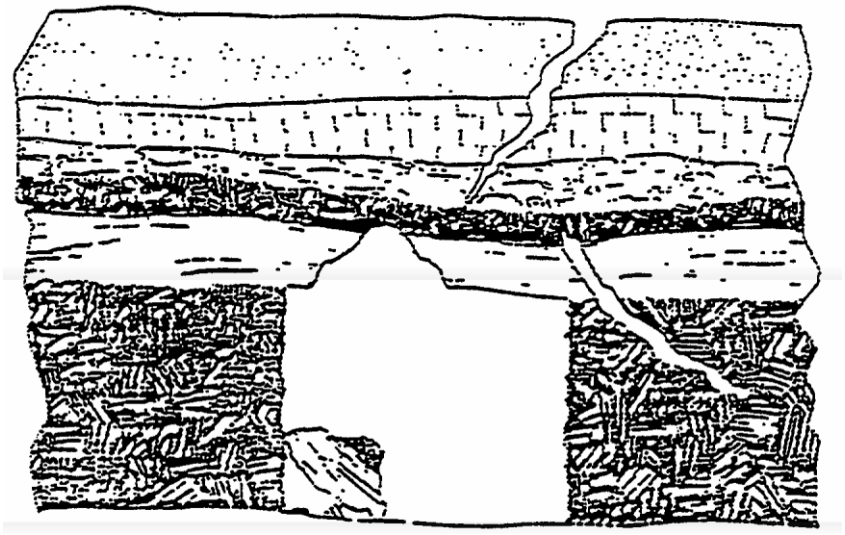
Safety and Health Regulations for Coal Miners 2001

4 VAC 25-60-70 C

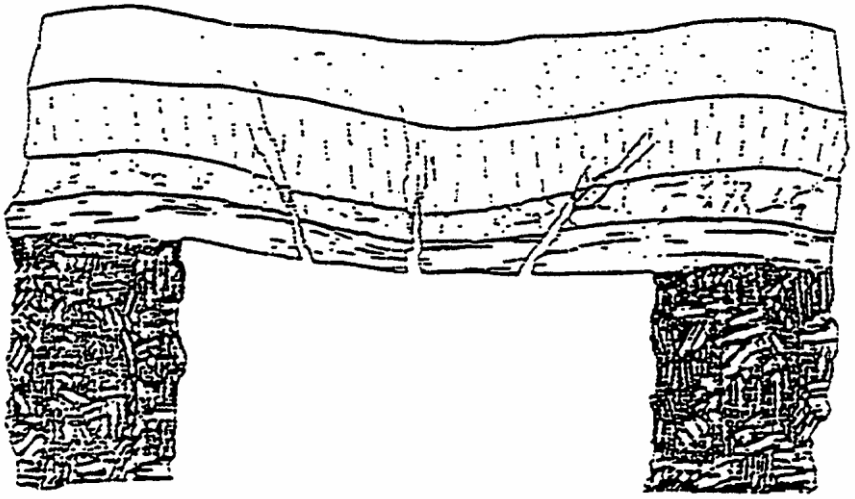
36. Q. Who shall certify the dead weight load of an ATRS?
    A. The dead weight load shall be certified by a registered professional engineer or the manufacturer of such product.

Safety and Health Regulations for Coal Miners 2001

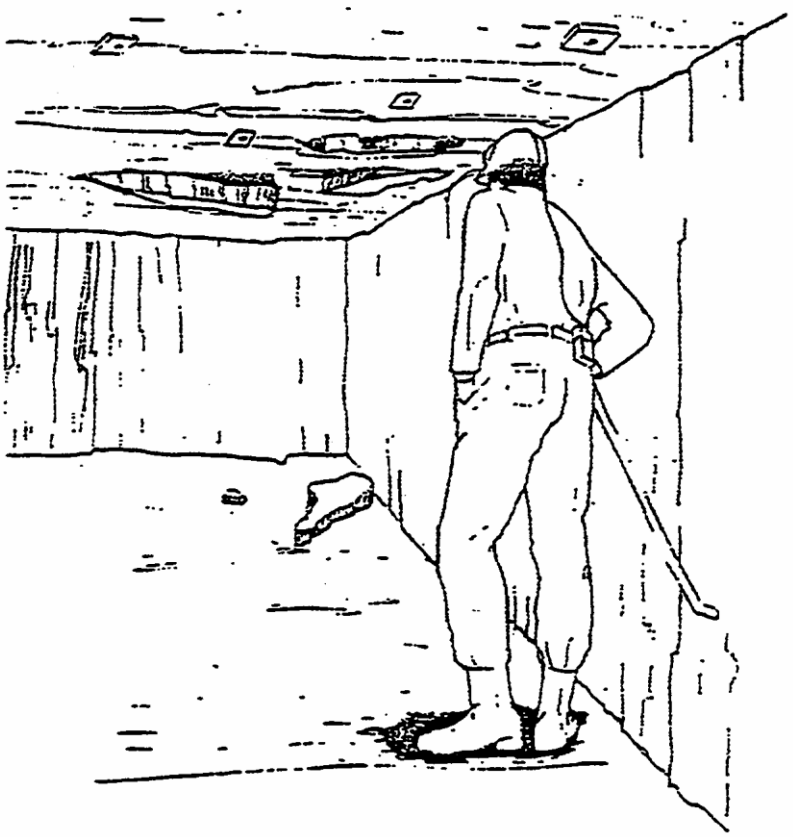
4 VAC 25-60-70 F



Mine strata with faults and intrusions.



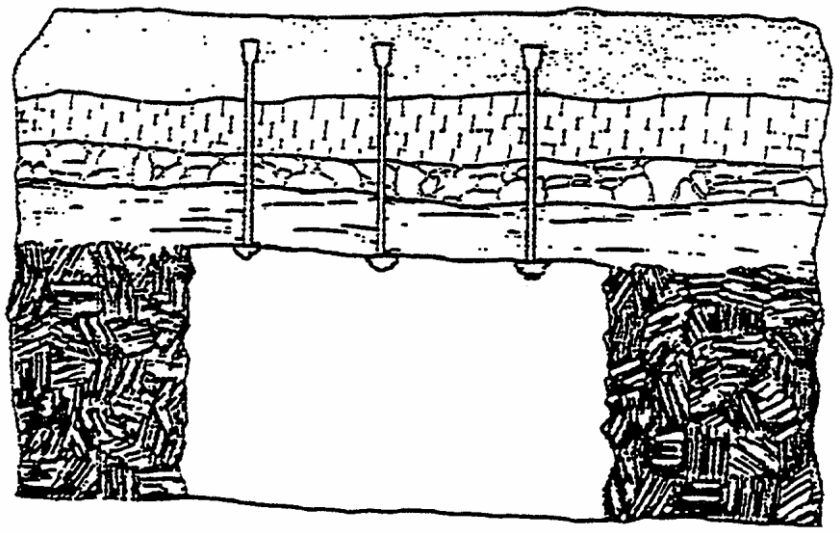
When coal is removed, the immediate roof begins to sag, and tension cracks appear.



When visual observation indicates a dangerous roof condition, never enter such area!

After making a visual inspection, a miner uses the sound-and-vibration method to test the roof.

A miner inspects and tests the working area often,
trims loose materials, follows the roof control plan, works from
a safe position, and always keeps a safe line of retreat.



Pillars of coal support the main roof. Roof control devices
(such as roof bolts) support only the immediate roof.

48. Q. What is the maximum speed of the inch tram control speed of an ATRS equipped roof bolter?
    A. The inch tram control speed shall in no case exceed 80 feet per minute.

Rules & Regulations Governing Installation and Use of Cabs and Canopies
480-05-98

49. Q. What shall be provided on all roof bolting machines used in Virginia coal mines?
    A. ATRS (automated temporary roof support systems) approved by the Chief.

Rules & Regulations Governing Installation and Use of Cabs and Canopies
480-05-98

50. Q. Where shall the controls be located that are used to position the roof bolting machine and to place the ATRS against the roof?
    A. The controls shall be designed such that they are operated from under permanently supported roof.

Rules & Regulations Governing Installation and Use of Cabs and Canopies 480-05-98

51. Q. What is the purpose of automated temporary roof support (ATRS) systems for roof bolting machines?
    A. ATRS systems replace manually setting temporary supports.

Rules & Regulations Governing Installation and Use of Cabs and Canopies 480-05-98

52. Q. What shall be immediately available at each mine for emergency use?
    A. Two 40-ton jacks or equivalent lifting devices.

§45.2-714.D.

53. Q. How often should roof, face and ribs be examined by the mine foreman?
    A. At least once each shift and as often as necessary to ensure safety.

§45.2-715.C.

54. Q. When can an employee go inby permanent roof support?
    A. Only for the purpose of setting temporary support in accordance with the approved roof control plan.

§45.2-717.A.

55. Q. Who shall advance under unsupported roof?
    A. No one, except those assigned to install temporary supports.

§45.2-717.A.

56. Q. What action shall be taken if roof, face or rib conditions are found to be unsafe?
    A. They shall be taken down or securely supported before other work is started.

§45.2-717.B.

57. Q. What shall be done with loose roof, loose faces and loose ribs?
    A. They shall be taken down or supported.

§45.2-717.B.

58. Q. What type of hand tool shall be used to pull down loose material?
    A. A slate bar of proper length.

§45.2-717.C.

59. Q. What action shall be taken if roof supports are accidentally dislodged?
    A. Roof supports shall be replaced promptly.

§45.2-717.B.

60. Q. When should a miner be prohibited from entering any underground area of a mine?
    A. Before the mine foreman completes the Pre-shift examination.

§45.2-826.A.

61. Q. What shall a mine foreman do when he finds a hazardous condition?
    A. The mine foreman shall take prompt action to correct hazardous conditions.

§45.2-831.

62. Q. What are some reasons that workers travel under "unsupported roof"?
    A. They do not realize that they have gone into an unsupported area, and did not intend to do so.
    They do not believe that it is unsafe to do so.
    They are trying to save time.
    It takes too much effort to set temporary supports.
    They have seen other workers go into an unsupported area.

MSHA Roof Fall Accidents Survey (Page 08)

63. Q. What is a kettle bottom?
    A. A cone shaped rock with tapering edges, embedded loosely in the roof.

Dictionary of Mining Terms

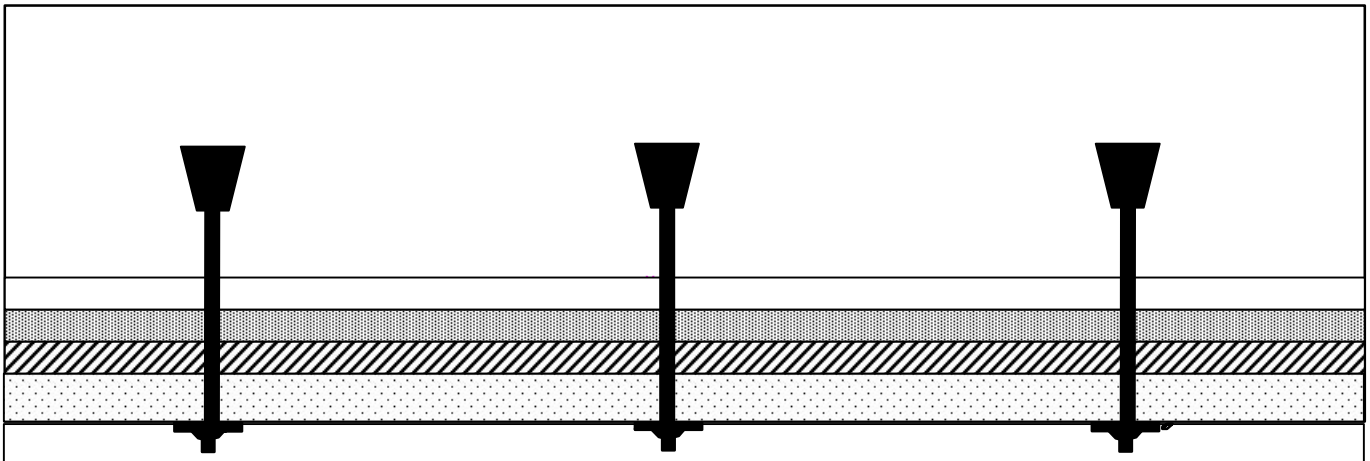
64. Q. What is torque?
    A. A "twisting" force applied to a roof bolt.

Dictionary of Mining Terms

65. Q. What is tension on a roof bolt?
    A. The amount of tightening force applied between the bearing plate and the anchor.

Dictionary of Mining Terms

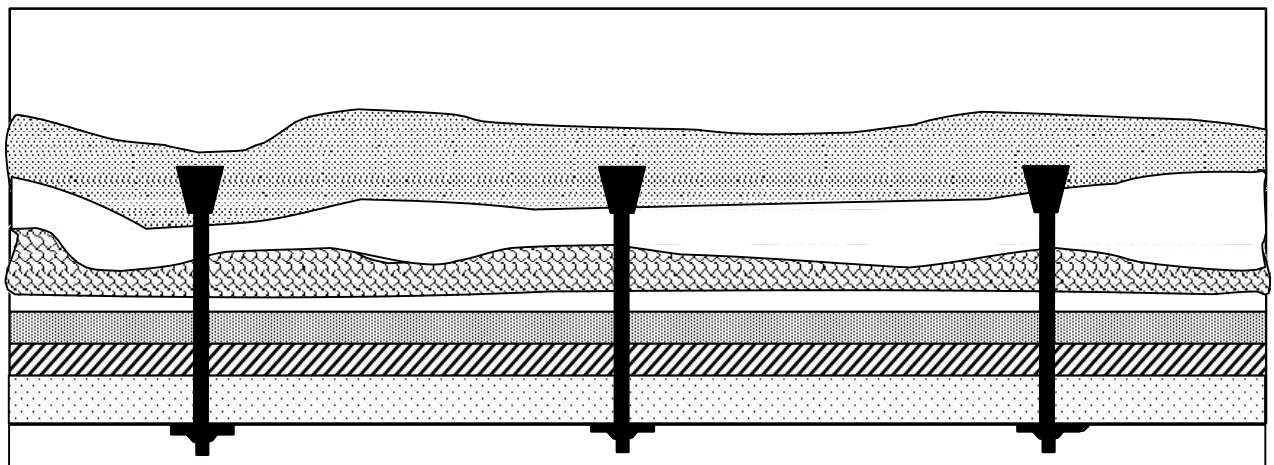
Roof Bolting
Suspension Method



SUSPENSION METHOD

The roof bolts tie the lower layers of the roof to a stronger layer. The lower layers hang from the upper layer.

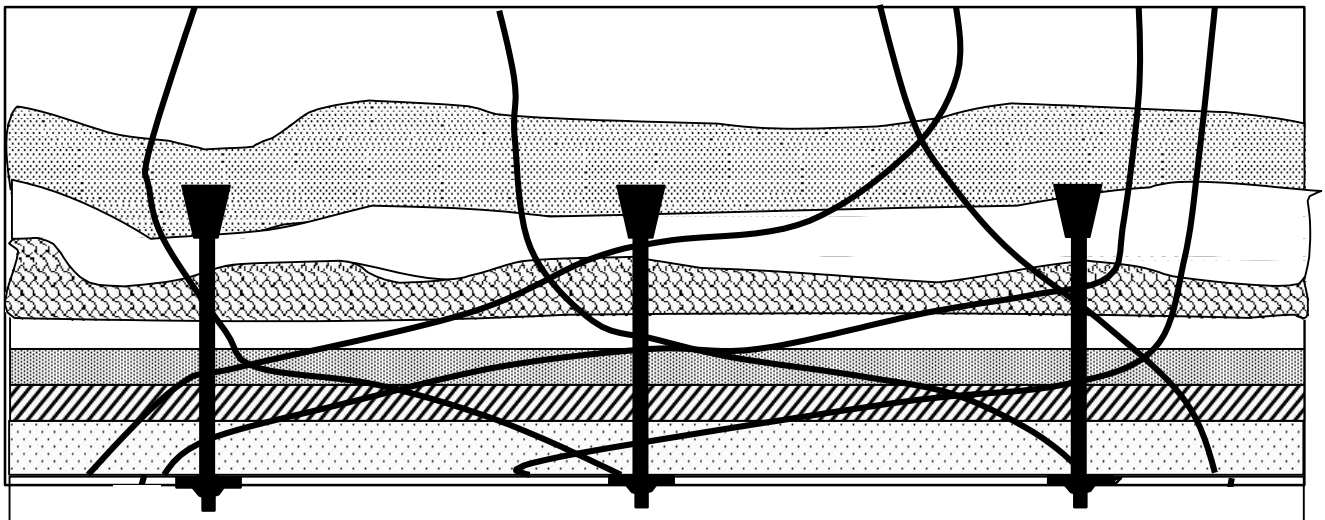
Roof Bolting
Beam Building Method



BEAM METHOD

The roof bolts provide support by creating beams of the different rock layers – bolts are used to bind these layers together much like the manufacture of plywood.

Roof Bolting
Keying Method



KEYING METHOD

The roof bolts intersect slip planes of randomly jointed rock, forming them into a stronger unit.

ROOF CONTROL PLAN

A. General Information

1. Date Plan Submitted: _____

_____ _____

2. MSHA I.D. Number 3. Mine Index Number

4. Company: _____

5. Mine Name or Number: _____

6. Address of Company: _____

7. Mine Location: _____ _____ _____

(Closest P.O.) (County) (State)

Reference (number of miles from nearest road, stream, hollow, branch, etc.) [ ]

8. Columnar Section Maximum Cover over Coal Bed (feet): _____

	Type Strata	Thickness (feet or inches)
Main Roof:	_____	_____
	_____	_____
Immediate Roof:	_____	_____
Name of Coal Bed:	_____ Floor:	_____

9. Type(s) of Plans: **Full bolting with fully grouted resin rods and point anchor roof bolts; Split and Slab plan.**

10. _____ _____ _____

Name of Company Official Responsible for Plan Title Date

B. Roof Control Plan Criteria

1. **Standards for Plan.** This is a minimum roof control plan and is formulated for normal roof and rib conditions while using the mining system(s) described.
   - All underground active workings and travel ways shall be secured and controlled to protect persons from falls of roof, face, or ribs.
   - The method of mining shall not expose miners to hazardous conditions.
   - In areas where adverse roof or rib conditions are encountered or indicated, the operator shall either remove those conditions or provide additional support where necessary.
   - If changes are to be made in the mining system that necessitates any change in the roof control plan, the plan shall be revised and approved prior to implementing the new mining system.
2. **Instruction of Personnel.** The operator or his agent shall instruct all personnel assigned to install or remove roof supports (temporary and/or permanent) prior to personnel performing such work.
   - This instruction shall insure that such persons are familiar with both the functions of the support being used and the proper installation procedures of the support, along with all other details within the approved roof control plan.
   - Persons in charge of miners who install supports shall be familiar with the approved roof control plan as well as any revisions to the plan.
   - All new miners shall have training in "Hazards of Mine Roof and Ribs" and have the contents of this plan explained to them before they begin work.
   - The approved roof control plan and any revisions shall be available to the miners at the mine and a copy of the plan posted conspicuously on the surface and at each working section underground.
3. **Drawings and Schematics.** Drawings indicating the width of openings, sequence of installation and spacing of supports, size of pillars along with the method and sequence of pillar recovery etc., are to be attached for each method of mining.
4. **Other Coverage.** Sections 75.215, 75.221, and 75.222, 30 CFR, are addressed as appropriate for the mining methods in use. Section 75.209 (c), 30 CFR, is addressed appropriate to the mining height of the mine.

C. Mining System Listing (i.e., equipment used):

1.	Continuous Miner w/Remote
2.	Dual Head Roof Bolting Machine w/ATRS
3.	Shuttle Cars
4.	Scoops
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	

D. Planned Mining Width and Projection Centers:

1. Entry Width(s): _____ Centers: _____

2. Crosscut Width(s): _____ Centers: _____

Additional information concerning planned mining widths and projections:

Pillar stability will be analyzed by using ACPS or other applicable

1. Roof Support Materials

1. **Portal Canopies.** A substantially constructed canopy or shield of sufficient size, length and strength to protect workmen from falling material will be provided at each drift/slope. The first cut from the highwall in any entry may be mined prior to setting the canopy provided that mining is done with a remotely operated continuous miner and the operator is positioned away from falling material. The canopy must be installed prior to any other work being done in the cut.
2. **Minimum Support Materials**. A sufficient quantity of support materials to be located on each working section no greater than four (4) crosscuts outby the section feeder is defined as follows: 20 roof bolts - 12 inches longer than the bolt length being used (does not apply to resin bolting, 20 posts of proper length with 20 cap blocks and 40 wedges, sufficient crib blocks to construct one (1) crib, one (1) bow saw with an extra blade, one (1) axe or one (1) 16-ounce hammer, one (1) 10-ton lifting jack with suitable bar, and one (1) slate bar of suitable length to safely scale the mine roof.
3. **Bearing plates.** Minimum size bearing plate will be 6" by 6" and will be installed firmly against the mine roof. Spherical washers or other angle compensating devices will be used to compensate for the angle when tensioned roof bolts are installed greater than 5 degrees from the perpendicular of the roofline. Roof caps of various designs/shapes will be used as additional bearing surface if used in conjunction with a standard bearing plate.
    - When roof is susceptible to sloughing, pin boards of varying lengths, metal straps, half headers, roof caps, or oversize bearing plates (minimum of 60 square inches) will be used in conjunction with roof bolts.
    - Bearing plate hole size will be compatible with manufacturer's recommendations.
4. **Posts**. Posts should be solid straight grain wood with the ends sawed square and free from defects that would affect their strength.
    - Clusters of two or more posts that provide equivalent strength may be used to meet these requirements. No round post shall have a minimum diameter less than four inches nor any split or square post have a cross sectional area less than 13 inches.
    - The minimum diameter or cross sectional area of wooden posts shall be as follows:

Post Length (inches)	Round Posts Min. Diameter (inches)	Split Posts Min. Area (sq. inches)	Square Posts Min. Dimension (sq. inches)
60 or less	**4**	**13**	**3 ¾" sq.**
61 to 84	**5**	**20**	**4 ½" sq.**
85 to 108	**6**	**28**	**5 ½" sq.**
109 to 132	**7**	**39**	**6 ¼" sq.**
133 to 156	**8**	**50**	**7 ¼" sq.**
157 to 180	**9**	**64**	**8" sq.**
181 to 204	**10**	**79**	**9" sq.**
205 to 228	**11**	**95**	**9 ¾" sq.**
Over 228	**12**	**113**	**10 ¾" sq.**

5. **Cap Blocks.** Cap blocks and footers shall have flat paralleled sides and be not less than 2" x 4" x 12" in size.
6. **Crossbars**. Wooden crossbars shall be of straight grain solid wood and shall be not less than three inches thick with a minimum cross-sectional area of twenty-four inches. Crossbars shall be blocked to equally distribute the load across their length. On haulageways, all crossbars or beams shall be installed with some means of support that will prevent the beam or crossbar from falling in the event the supporting legs are accidentally dislodged.
7. **Planks**. Minimum plank dimensions shall be one inch thick and six inches wide in varying lengths.
8. **Crib Blocks**. Crib blocks shall have at least two flat paralleled sides and adequate in size.
9. **Metal Jacks**. Metal jacks used for roof support shall have a minimum-bearing surface of not less than 36 square inches.
10. **Channel and/or Channel Plates.** Where multiple vertical cracks (mountain cracks, stress cracks, hill seams, mud seams, etc.) are present in the mine roof channels will be installed as follows:
    - Channels with matching plates (where plates are applicable) will be installed in conjunction with roof bolts.
    - Channels will be installed for the entire length of the multiple cracks on 4-foot minimum centers.
    - The length of the channel will be sufficient to span the multiple cracks. More than one section of channels may be required.
11. **Cable Roof Bolt Installation Instructions.**
    - Drill the hole approximately 1" longer than the bolt to be installed. Measure the distance from where the plate touches the roof to the top of the bolt.
    - Insert the appropriate length resin cartridges(s) into the hole (a minimum grout length of ½ of the bolt length or the minimum amount specified in the roof control plan). Insure that the resin cartridge(s) is inserted to the top of the hole without breaking.
    - Insert the cable bolt into the hole with the button or bird caged end first. Insert the cable bolt as far as possible into the borehole by hand.
    - With the roof bolt head in the bolt wrench, push the cable bolt to the top of the hole. Insure that the stiffener tube enters the hole smoothly. When the stiffener tube is collared in the borehole, start slow rotation of the cable bolt to aid in the ease of insertion and provide mixing of the resin.
    - Do not thrust the roof plate tight against the roof.
    - Keeping the roof plate slightly from the roof and without excessive upward boom pressure, rotate the roof bolt for 5 to 10 seconds or as recommended by the resin manufacturer.
    - When the proper resin mix time has been achieved, stop rotation, thrust the head of the cable roof bolt and plate tight against the mine roof and hold until the resin hardens.

Note: Cable roof bolts will be used as supplemental support only. Also, cable bolts with buttons are for 1" diameter holes. Cable bolts with birdcages are for 1" or 1 3/8"

diameter holes.

12. **Roof Arches/Steel Sets.**

- Roof arches/steel sets may be used as either primary or supplemental support.
- Roof arches/steel sets will be installed in accordance with manufacturer's recommendations. A copy of the manufacturer's specifications will be kept at the mine, available upon request by MSHA and/or Virginia Coal Mine Safety personnel.
- Roof arches/steel sets will be installed on not more than 4' centers.
- A roof arch/steel set must be assembled either under permanently supported roof or under previously erected arches.
- Roof arches/steel sets will be set and connecting rods loosely assembled until the lagging (wood, steel reinforced concrete crib block or metal) is installed. The roof arches/steel sets will then be tightly secured.
- The area between the roof arches/steel sets will be filled with wood, concrete crib blocks or metal lagging. The lagging will correspond with the web depth of the roof arch/steel set. Crib block, if used, will not be less than 4" square. If metal lagging is installed, it will be no less than 20-gauge. The steel reinforced concrete crib block will be no less than 4" square.
- The size and type of roof arches/steel sets will be determined by conditions present at the installation site but in no instance will the roof arch/steel set be less than 5" by 19 lbs./ft.
- Roof arches/steel sets may be supplied from different manufacturers.

13. **Roof Bolts.** Manufacturer certification that the material was manufactured and tested in accordance with ASTM F432-95 is available at the mine.

Roof Bolt Materials List

Type of Bolting System	Min. Length	Type Steel	Bolt Head Type	Flange Size	Type Anchor	Size Finish Bit	Torque Requirements (ft-lbs)		Length of Grout
	(in.)			(in.)		(in.)	Install	Evaluation	
Mech. Anchored Roof Bolts		5/8" HS	Std.	1 5/8 or larger	Expansion Shell	1 3/8	130-165	65-245 Wood 91-245 Rock	N/A
		3/4" HS	Std.	1 5/8 or larger	Expansion Shell	1	130-165	65-245 Wood 91-245 Rock	N/A
		5/8"EHS	Std.	1 5/8 or larger	Expansion Shell	1	180-240	90-360 Wood 126-360 Rock	N/A
Fully Grouted Resin Rods		#5 Rebar Grade 60	Std.	1 5/8 or larger	Fully Grouted Rebar	1	N/A	150	Fully Grout Hole
		#6 Rebar Grade 40	Std.	1 5/8 or larger	Fully Grouted Rebar	1	N/A	150	Fully Grout Hole
		#7 Rebar Grade 40	Std.	Approx. 2	Fully Grouted Rebar	1 3/8	N/A	150	Fully Grout Hole
Point Anchor or Combination Anchor Roof Bolts		#5 Rebar Grade 60	Tab/ Shear Dome Resistance	1 5/8 or larger	#5 Rebar (May use two speeds of resin to fully grout rebar)	1	160-225	See Section 75.204(F)(5) 30 CFR	24"
		#6 Rebar Grade 40	Tab/Shear Dome Resistance	1 3/4	#6 Rebar (May use two speeds of resin to fully grout rebar)	1 or 1 1/32	160-225	See Section 75.204(F)(5) 30 CFR	24"
		3/4" EHS	Std.	1 5/8 or larger	#7 Rebar with Couplers	1 3/8	275 325	See Section 75.204(F)(5) 30 CFR	24"
		# 7 Rebar Grade 60	Std.	1 5/8 or larger	#7 Rebar with Couplers	1 3/8	275-325	See Section 75.204(F)(5) 30 CFR	24"
		#6 Rebar Grade 40 Bendable	Tab/ Shear Dome Resistance	1 3/4	#6 Rebar (May use two speeds of resin to fully grout rebar)	1 or 1 1/32	120-160	See Section 75.204(F)(5) 30 CFR	24"
		.677 Dia. Grade 75	Std.	1 5/8 or larger	D-8 or Equiv. Expansion Shell	1 3/8	275-325	See Section 75.204(F)(5) 30 CFR	24"
		#5 Rebar Grade 60	Std.	1 5/8 or larger	J-1 or Equiv. Expansion Shell	1	160-225	See Section 75.204(F)(5) 30 CFR	24"
		1" EHS	Std.	1 5/8 or larger	# 8 Rebar	1 1/2	300 Min.	See Section 75.204(F)(5) 30 CFR	36"

* Point anchor/torque tension roof bolts may be fully grouted using two speed resin.
** The fiberglass rib bolt assembly consists of a rod with a threaded nut used as the bolt head. The assembly is not intended to be used as a tension system. Should the bolt extend through the nut during installation, the capacity of the bolt head is not affected and the assembly maintains the original tensile strength. Note: This does not exclude bolts listed on the Roof Bolt Materials List from being used for rib bolting.

2. Roof Bolting – General

1. **Installing Temporary or Permanent Support.** Only those persons engaged in the installation of temporary and/or permanent supports shall be allowed to proceed beyond the last full row of permanent supports.

    - Before any person proceeds in-by permanently supported roof to install supports, a thorough visual examination of the unsupported roof and ribs shall be made. If the visual examination does not disclose any hazardous condition, persons proceeding in-by permanent supports shall do so with caution and, if conditions permit, will test the roof by the sound and vibration method as they advance into the area.

    2. When installing supports in the face area, personnel installing supports will be within five feet of a temporary or permanent support. If hazardous conditions are detected, corrective action will be taken to give adequate protection to personnel in the area involved.

    - Roof bolts will be installed in a reasonably straight line crosswise to obtain optimum protection of the ATRS and previously installed roof bolts, unless otherwise specified in this plan.

    - Roof bolts of different types (fully grouted, point anchor, etc.), being installed in pattern as primary roof support, cannot be mixed without prior approval.

    - All tensioned roof bolts will be installed with hardened washers.

2. **Automated Temporary Roof Support System.**

    - All automated temporary support (ATRS) systems on roof drills that have not been previously approved for use in the State of Virginia and MSHA Norton District will be inspected and approved by MSHA and Virginia Coal Mine Safety personnel prior to being used in the face.

    - Where the ATRS will effectively go against the mine roof, such ATRS will be used during roof bolt installation and will be positioned firmly against the mine roof not more than 5 feet inby permanent support with a dual head roof bolting machine.

    - Where an ATRS equipped drill cannot be used as a result of mining conditions (i.e., a roof fall) a minimum of four (4) safety posts or jacks will be installed on not more than 5-foot centers lengthwise and 4-foor centers crosswise. The installation of such supports or jacks will be started no later than 15 minutes after the loading cycle is completed and will continue until at least the minimum number is installed as required by the approved roof control plan. Temporary supports will be used a maximum of 40 feet or two cuts, whichever is less..

3. **Approaching outcrop.** When mining approaches within 150'of an outcrop, roof bolt lengths will be adequate to support the mine roof and be a minimum of 1-foot longer than the minimum length required in the roof control plan. 24 hours prior to a punchout, MSHA and Virginia Coal Mine Safety will be notified in order to conduct an on-site evaluation of the highwall.

4. **Test holes.** In each active working face where roof bolts are being installed, at least one test hole will be drilled into the mine roof at a depth of at least 12 inches deeper (minimum of 72 inches) than the primary roof supports being installed to determine the nature of the strata. A minimum of one test hole will be drilled each cut regardless of cut depth. Test holes will be drilled during the installation of the first row of roof supports and left open for evaluation.

5. **Torque of Tensioned Roof Bolts.**

   - In each roof bolting cycle, the actual torque or tension of the first tensioned (either point anchor or torque tension) roof bolt installed with each drill head will be measured immediately after it is installed. Thereafter, at least one roof bolt out of every four (4) installed by each drill head will be measured.
   - A torque wrench, which indicates by direct reading the actual torque on the roof bolt installed, will be provided on each roof bolting machine installing tensioned roof bolts.

6. **Fully Grouted Roof Bolts.**

   - For test purposes, the first installed fully grouted resin rod in each cycle of each working place will be checked for proper installation after installing the first line of permanent supports and prior to removing the temporary roof support system. The torque applied will be 150 foot-pounds. Should the rod rotate one full turn (360 degrees), a second rod will be tested in the same manner. If this rod also turns, resin installation will be discontinued until reasons for failure of the resin is determined. A click type torque wrench is recommended for the torque tests.
   - During the installation of fully grouted roof bolts, the entire length of the hole will be filled with resin.

7. **Handling of Resin**. Persons responsible for the installation of resins shall be instructed in safe handling precautions for such materials.

   - Resin will not be used if the manufacturer's recommended shelf life is exceeded.
   - Resin packages will be protected from excessive heat and cold during storage and will not be used in areas where the ambient temperature falls outside the range recommended by the manufacturer.
   - Resins supplied to the working section will be controlled to prevent intermixing of resin from different manufacturers.
   - Resin cartridges will be sized compatible to hole/roof bolt dimensions and installed according to manufacturer's recommendation.
   - Excessive spinning or mixing of resin during installation may result in ineffective roof bolt installation.

8. **Drilling and Installation Precautions.**

   - The hole dimensions (diameter, length, etc.) for roof bolt installations are critical.
   - Drill steel will be adequately marked to ensure the proper depth hole.
   - All bearing plates will be installed and maintained firmly against the mine roof.

9. **Clean Up and Rehabilitation Work.**

- Where roof material is being taken down, a minimum of 2 temporary supports on not more than 4-foot centers will be installed between the workmen and the material being taken down, unless such work can be done from an area supported adequately by permanent roof supports.
- Where rehabilitation work is to be performed, a plan to install roof supports will be approved. Where roof bolts are being replaced in isolated instances, 2 temporary supports will be installed within a radius of two feet from each bolt to be replaced, unless an ATRS equipped roof bolting machine is utilized.
- Where crossbars, cribs, posts or roof bolts are being installed in an area where roof failure is indicated or has occurred, a minimum of one row of temporary supports will be installed on not more than 4' centers crosswise and not more than 5' inby permanent support unless an approved ATRS system is used.
- All roof falls and other areas in the active workings where the mine roof material has been removed from it's natural location by any means and is not being cleaned up, will be posted off at each entrance to the area by a minimum of one row of posts, or equivalent installed on not more than 4' centers across the opening, or equivalent.
- Where roof falls have occurred, at all overcasts, boom holes, and other construction sites that require removal of mine roof material, by blasting, ripping with a continuous mining machine, cutting with a cutting machine, or other means, the roof will be considered unsupported. If miners are required to enter such area, either to travel over the fallen material, to clean it up, or to perform other duties, the roof will be supported adequately. Mine management will devise and have in writing at the scene of such unsupported roof, a plan incorporating the following procedures:

(1) All work will be performed by persons instructed and experienced in rehabilitation work.

(2) Adequate temporary support on not more than 4' centers will be set at all entrances to the unsupported area except where clean-up and/or roof bolting operations are being conducted.

(3) Temporary supports, set on not more than 5' centers from permanent support and 4-foot centers crosswise, or an approved ATRS system will be used to support the roof prior to installing permanent roof supports. Temporary supports will be replaced by permanent roof supports, such as roof bolts, posts, cribs, collars or a combination of these types of supports installed on centers not to exceed 4' maximum.

(4) When re-supporting these areas, either by bolting, timbering, cribbing, collaring, etc., each row of permanent roof supports will be completed prior to removing temporary supports and before other work is performed.

(5) Where necessary to remove material before supports can be set, such removal will be performed from under permanently supported roof at all times.

(10) **Supplemental Support for Refuge Alternatives.**

The roof support requirements, in the existing Approved Roof Control Plan, are sufficient to protect refuge alternatives at the mine. If required examinations of refuge alternatives indicate that additional roof support is necessary, supplemental support such as cable bolts, super bolts, timbers, safety jacks, cribs or alternative crib supports or a combination of any of the above supports, will be installed as needed to protect the refuse alternative(s).

3. Mining System

1. **Sight Line.** A continuous sight line or other method of directional control will be used to maintain the projected direction of mining in entries, rooms, and crosscuts.

2. **Highwall Evaluation.** Prior to starting drift or slope operations, a careful evaluation of the highwall and strata above the projected openings will be conducted. Any loose material will be removed or otherwise controlled. If necessary, the highwall strata will be benched or sloped to protect against slides and/or falls of material.

3. **Cut depths.**

   - The maximum allowable cut depth for a manually operated continuous miner is 20 feet, or the distance as measured from the most inby manually operated control (hand or foot) to the inby end of the continuous mining machine, whichever is less. At no time will any manually operated control (hand or foot) be advanced inby the last full row of permanent supports.
   - The maximum allowable cut depth for a remotely operated continuous miner is 20 feet for development and retreat mining. Before the maximum allowable cut depth can exceed 20 feet, specific safety precautions for a “deep cut” will be approved as part of this plan. The continuous miner will be operated remotely when developing a deep cut.
   - Cut depth is measured from the last full row of permanent roof supports to the point of deepest penetration.

4. **Working Places.**

   - A working face will not be mined through into an unsupported area of active workings, except when the unsupported area is inaccessible.
   - The mine roof for all working faces will be permanently supported on the next regular scheduled bolting cycle after the working face is exposed and the mining cycle is completed. Places should be bolted within 24 hours after mining, especially if the roof strata is laminated, unconsolidated material. Places will not remain unbolted over weekends or any period in excess of 2 days.
   - Should conditions exist that prohibit the installation of roof bolts within the prescribed distance from the face (i.e. water, draw rock, etc.), the condition will be corrected and roof supports installed as prescribed on the next regular mining cycle.
   - Upon completion of the loading cycle, a readily visible warning device or physical barrier will be conspicuously placed at or near the last row of permanent support to warn persons approaching any area that is not permanently supported.

- Line curtains will be extended remotely without exposure of any person inby permanent support.
- In working faces where draw rock has fallen and such material has to be removed prior to installing roof supports, the removal will be accomplished by loading out with mechanical equipment with no workers exposed inby the last full row of permanent supports.
- To enable persons to remove loose roof and/or ribs from a safe position without exposure to fallen material, a bar of suitable length and design will be provided on all mobile face equipment other than haulage equipment.

5. **Excessive Widths.**

- When maximum allowable widths are exceeded due to mining, rib sloughage, etc. **on the working section where mobile equipment is required to regularly travel and no adverse roof conditions exist, the excessive widths** (more than 12 inches wider for a length of 5 feet or greater) will be corrected by installing **supplemental roof bolts of equal or greater strength and of a length that is at least 2 feet longer than the primary roof supports being used** if the excessive width does not exceed 24 inches.
- When the maximum allowable widths are exceeded by 24 inches **on the working section**, standing supports such as timbers, cribs, half-cribs, jacks or beams will be installed to reduce the width to the maximum allowable width.
- When the maximum allowable widths are exceeded by 12 inches for more than 5' **in outby areas where mobile equipment is required to regularly travel**, roof bolts of greater strength and of a length that is at least 2 feet longer than the primary roof supports or standing supports such as timbers, cribs, half-cribs, jacks, beams or a combination of these supports will be used to adequately support the area.

  Note: These requirements are minimums and the type of roof supports and spacing will be capable of adequately supporting the mine roof.

6. **Rib Control.**

- Adverse ribs will be either taken down or supported.
- When adverse ribs are to be supported, supplemental supports will be installed to adequately support the ribs. These supports will include but not be limited to: angle brackets, timbers, cribs, ACS (Alternative Crib Supports), steel supports, mesh, wire ropes, screen, rib bolts, arches, or any combination of these materials.

Note: When timbers/jacks are used to support ribs and adverse rib conditions are exerting pressure against the timbers/jacks, such supports will be secured.

7. **Crosscuts**

- Crosscuts will be started only in areas that are supported with permanent roof supports. When headings and crosscuts are to be simultaneously developed, a minimum of three (3) rows of permanent roof supports will be installed inby the proposed crosscut prior to starting the crosscut.
- An entry cannot be advanced inby the next projected crosscut until the crosscut being developed is completed. Roof bolting operations and coal extraction will not be performed simultaneously in an entry and an interconnected crosscut except when

roof-bolting on the intake side.

- Openings that create an intersection will be supported with a minimum of one row of temporary or permanent roof supports installed on not more than 5-foot centers across the opening before any other work or travel in the intersection. No work other than making examinations required by the Virginia T45. Mines, Minerals and Energy Laws or 30 CFR or work to correct hazardous conditions will be conducted in or inby the openings if these supports are not installed.
- Crosscuts may be developed to the right and left simultaneously from the same mine opening, however no crosscut will be created by development in more than one direction from adjacent entries. Once a crosscut being developed holes through into an entry, the adjacent crosscut may not interconnect the same entry until the original hole through has been permanently supported. Once a crosscut has been started off an entry or room, it will be permanently supported prior to the adjacent crosscut interconnecting into the same entry.
- When crosscuts are to be developed right and left from the same opening, the initial cut of the first crosscut mined will be permanently supported prior to beginning the second crosscut.

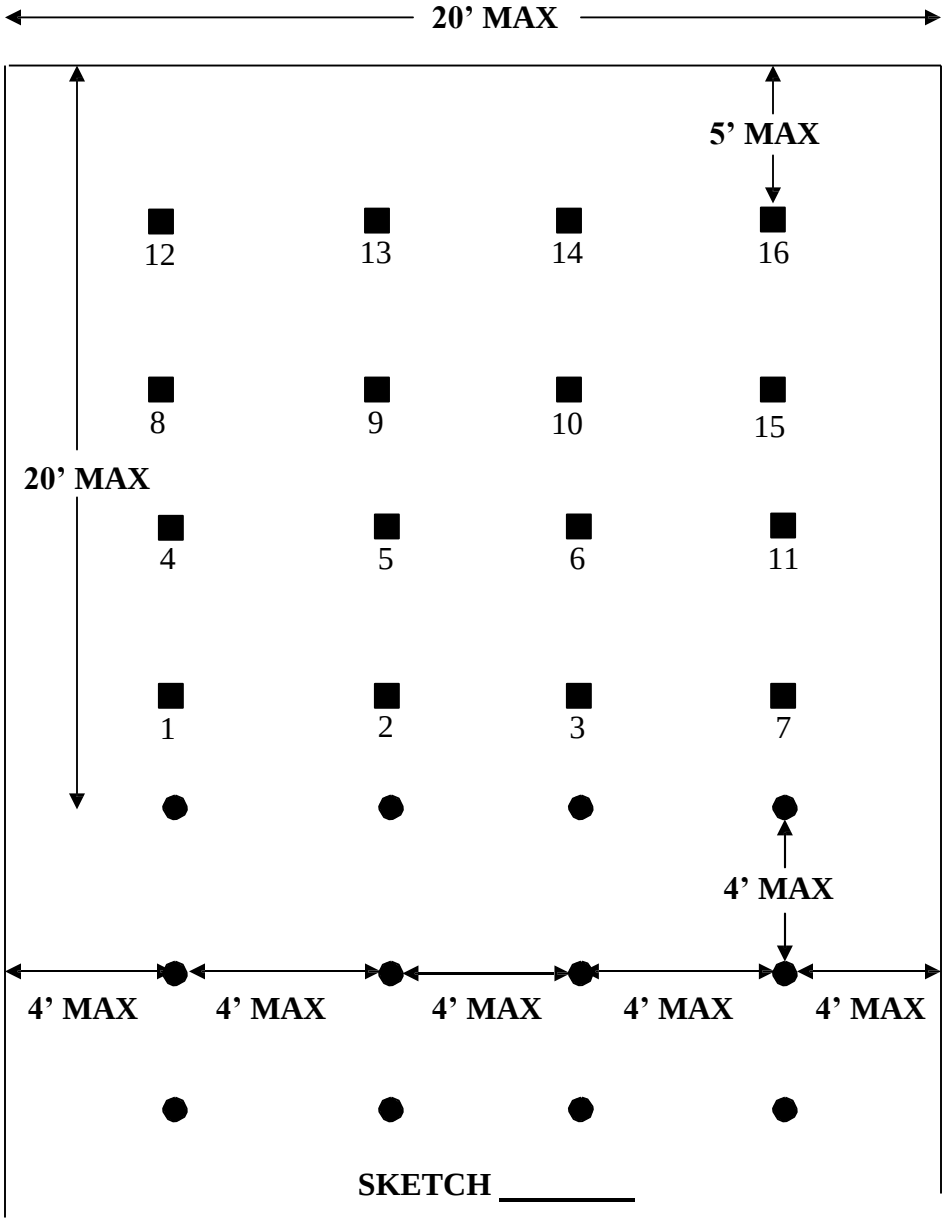
8. **Continuous Mining Machine Recovery Plan.** Should the continuous mining machine break down or otherwise become disabled inby the last row of permanent roof supports during mining, the following procedures will apply:
   - A minimum of two rows of timbers or jacks will be installed in accordance with the approved roof control plan to provide a safe walkway to the point adjacent to the continuous mining machine where work to repair the machine can be performed, or to the rear of the machine to enable remote recovery. Where conditions warrant, cribs or other appropriate supports will be installed.
   - No more than 4 ft. spacing will be allowed between supports.
   - Only work to enable the machine to be trammed to or pulled under permanent support will be performed.
   - The area will be continuously monitored by a certified mine foreman. Should it become evident that roof conditions are deteriorating, all persons will be removed from the area until additional measures can be made to safely perform recovery work.
   - Temporary supports will be removed remotely.
9. **Remote Control Operation Procedures of Continuous Mining Machines.** Remote control will be accomplished by operating in the following manner:
   - While using remote controls, the continuous mining machine operator and other persons will position themselves:
     1. Under permanently supported roof.
     2. No closer than the second full row of roof bolts outby the face. A full row of roof bolts is a row in which roof bolts have been installed on a pattern required by the Approved Roof Control Plan across the working place from rib to rib. If any of the roof bolts are sheared or otherwise rendered ineffective, or if the complete row of roof bolts was not installed as a result of an off-set in the working face, the next outby full row of roof bolts installed on pattern required by the Approved Roof Control Plan will be

used as the reference point.

3. Any person designated by the operator to operate a continuous mining machine will be trained in all aspects of remotely tramming the machine. No person will be allowed to be within the turning radius (the area between the machine and coal rib or other piece of equipment) of the continuous mining machine while tramming from place to place or changing the machine from side to side in the working face.

- The continuous mining machine will be operated by the machine's on-board controls when the continuous mining machine operator is positioned within the machine's deck.
- At any time the continuous mining machine is being operated using a remote control unit, the unit will be equipped with an emergency stop switch or panic bar that will permit the machine to be de-energized quickly in the event of an emergency. The emergency stop switch or panic bar will be prominent and readily accessible.
- All persons will be positioned in a safe location away from pinch points created by either the continuous mining machine and/or other equipment.
- All persons will be positioned in a safe location, outby the continuous mining machine operator, while coal is being cut, mined or loaded. The number of persons positioned at the continuous mining machine will be limited to those necessary to facilitate the mining process. When persons other than those necessary to facilitate the mining process enter the area, the mining process will stop. Persons will not be allowed to congregate in the area surrounding the continuous mining machine when coal is being cut, mined or loaded.
- When remote systems are being transported or stored in the mine, they shall be secured and/or de-energized. Only one (1) remote control system using the same frequency may be used on the same section at any one (1) time.
- The pump motor of the continuous mining machine will be de-energized during loading or unloading of the trailing cable that supplies electrical power to the continuous mining machine.

SINGLE HEAD ROOF BOLTER – BOLT INSTALLATION SEQUENCE



SKETCH _____

LEGEND:

■ ROOF BOLTS TO BE INSTALLED

● INSTALLED ROOF BOLTS

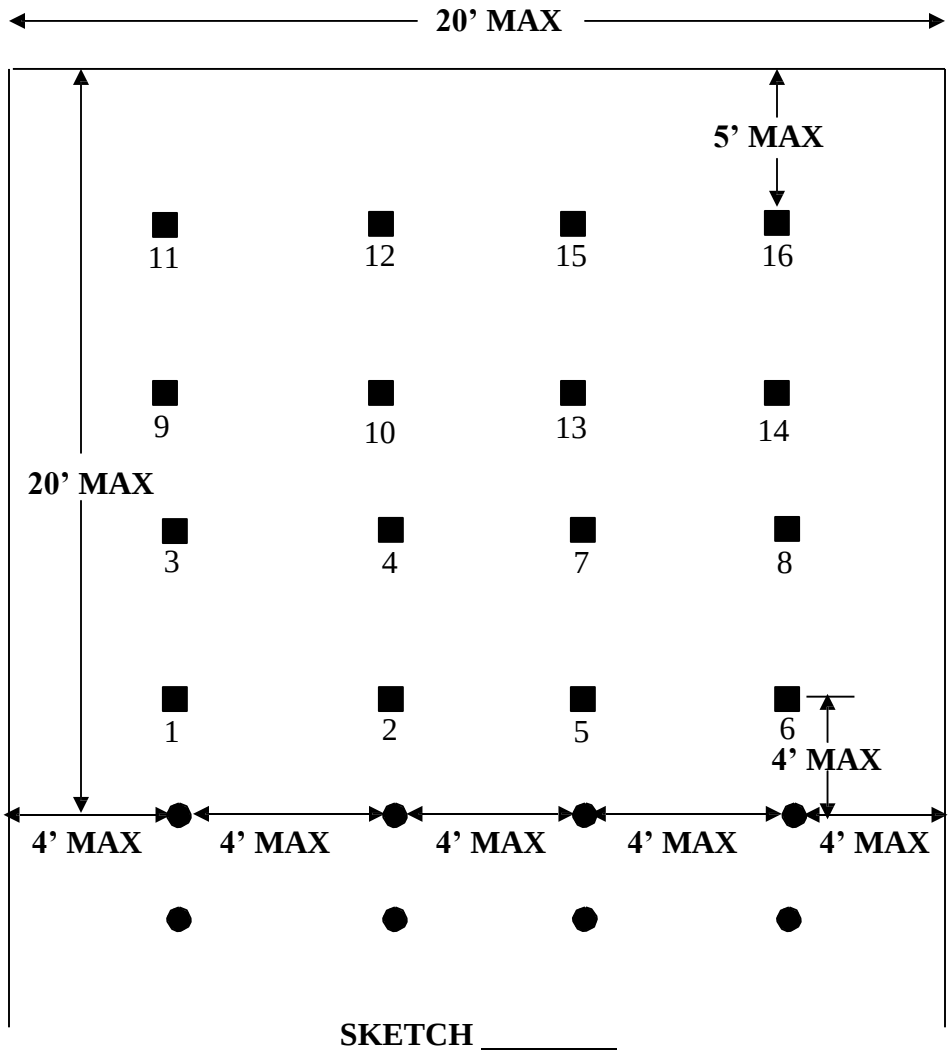
1. THE ATRS (AUTOMATED ROOF SUPPORT SYSTEM) WILL BE PLACED FIRMLY AGAINST THE MINE ROOF PRIOR TO STARTING ANY WORK INBY PERMANENT SUPPROTS.

2. DURING BOLTING OPERATIONS WITH THE ATRS, EMPLOYEES SHOULD NOT BE PERMITTED TO WORK ON THE RIGHT SIDE OF THE ROOF BOLTING MACHINE.

3. EXCEPT FOR ROOF BOLTS ADJACENT TO THE RIGHT RIB, THE ROOF BOLTING MACHINE MUST BE POSITIONED AS MUCH AS POSSIBLE WITH THE REAR OF THE MACHINE TOWARD THE RIGHT RIB TO OBTAIN OPTIMUM PROTECTION FROM THE ARTS.

4. WHERE THE ATRS MUST BE LOWERED TO REPOSITION THE MACHINE DURING OR FOLLOWING DRILLING OPERATIONS, THE MACHINE OPERATOR WILL PLACE HIMSELF UNDER PERMANENT ROOF SUPPORTS WHILE OPERATING THE ATRS AND TRAM CONTROLS.

SINGLE HEAD ROOF BOLTER (SWING HEAD)
BOLT INSTALLATION SEQUENCE



SKETCH _____

LEGEND:

■ ROOF BOLTS TO BE INSTALLED

● INSTALLED ROOF BOLTS

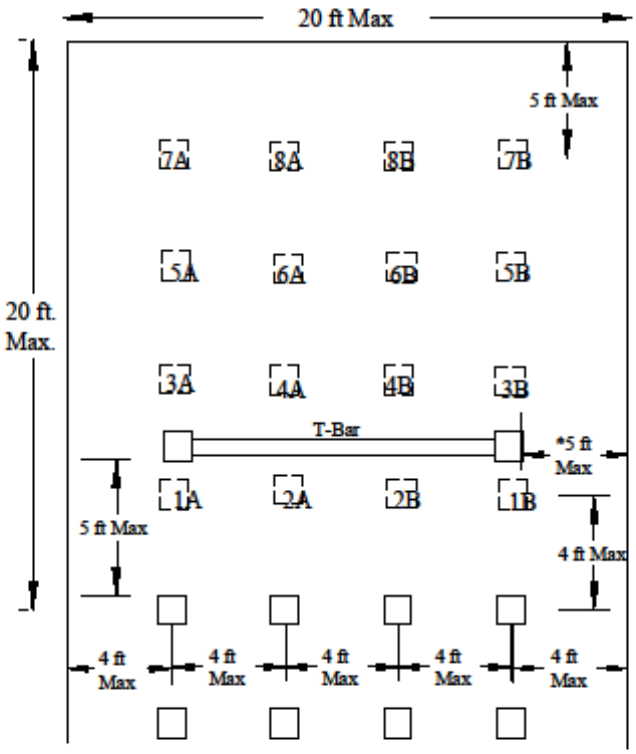
1. THE ATRS (AUTOMATED ROOF SUPPORT SYSTEM) WILL BE PLACED FIRMLY AGAINST THE MINE ROOF PRIOR TO STARTING ANY WORK INBY PERMANENT SUPPORTS.

2. DURING BOLTING OPERATIONS WITH THE ATRS, EMPLOYEES SHOULD NOT BE PERMITTED TO WORK TO THE RIGHT SIDE OF THE ROOF BOLTING MACHINE.

3. WHERE THE ATRS MUST BE LOWERED TO REPOSITION THE MACHINE DURING OR FOLLOWING DRILLING OPERATIONS, THE MACHINE OPERATOR WILL PLACE HIMSELF UNDER PERMANENT ROOF SUPPORTS WHILE OPERATING THE ATRS AND TRAM CONTROLS.

Dual Head Roof Bolter

Scale: 1" = 5'



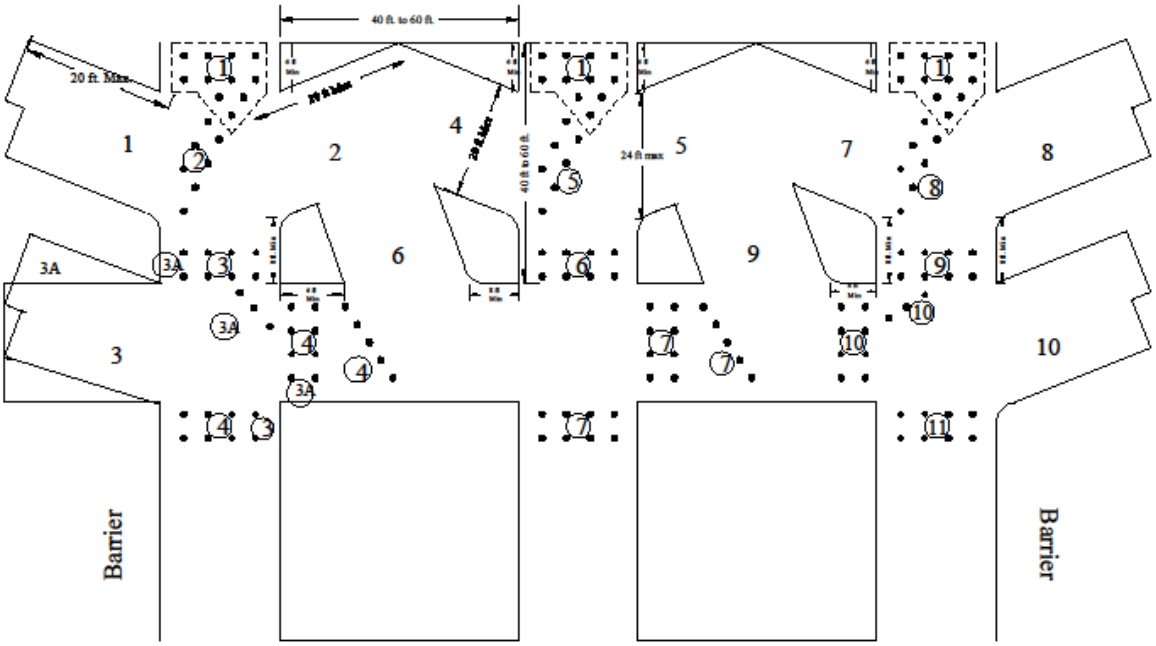
LEGEND

Installed Roof Bolts

Roof Bolts to be Installed

For all type roof bolts utilizing double head roof bolting machine with T-Bar type ATRS.

1. Upon completion of the loading cycle and with the roof drill operators under permanently supported roof, the roof bolting machine is positioned so the T-bar is no more than 5' inby the last full row of roof bolts. The roof support bar is placed firmly against the mine roof. The drill heads are swung out to install roof bolts 1A and 1B.
2. Following the installation of roof bolts 1A and 1B, the drill heads are swung toward the center of the place and roof bolts 2A and 2B are installed.
3. This sequence of installing roof bolts is repeated until roof bolts have been installed to within 5' of the face.



3 Cut Partial Pillaring
Left to Right Sequence
20 Ft. Cut

Scale 1" = 20'

Drainage

1. Q. What is the effect of undrained bodies of water on ventilation?
   A. Undrained bodies of water may block air courses and interfere with ventilation.

Underground Coal Mine Guidebook

2. Q. A pump is discharging from a sump 610 feet vertically below the surface. Assuming a friction head equal to 10 percent of the static head, what is the total pumping head?
   A. 671 feet.
   SOLUTION: 610 x 110% = 671 feet

Underground Coal Mine Guidebook

3. Q. What horsepower would be required to pump 400 gallons per minute to an elevation of 300 feet assuming the friction loss in the pipe equals 15 percent of the static head?
   A. 34.9 horsepower
   SOLUTION: 400/min. x 8.34 lbs/gal' = 3,336 lb/min
   300 ft x 1.15 = 345 ft
   3,336 lbs/min x 345 ft = 1,150,920 ft-lb/min
   SINCE 1 Hp = 33,000 ft-lb/min, we divide 1,150,920 by 33,00 to obtain the number of horsepower.

$$\frac{1{,}150{,}920}{33{,}000} = 34.9 \text{ horsepower}$$

Underground Coal Mine Guidebook

4. Q. What is the weight of one cubic foot of water?
   A. One cubic foot of water weighs 62.4 pounds.

Underground Coal Mine Guidebook

5. Q. How many gallons of water will occupy one cubic foot of space?
   A. One cubic foot of water contains 7.5 gallons.

Underground Coal Mine Guidebook

6. Q. What is the weight of one gallon of water?
   A. 8.34 pounds.

Underground Coal Mine Guidebook

7. Q. How shall travelways, haulageways, and escapeways be maintained?
   A. They should be properly drained and maintained free from obstructions.

Underground Coal Mine Guidebook

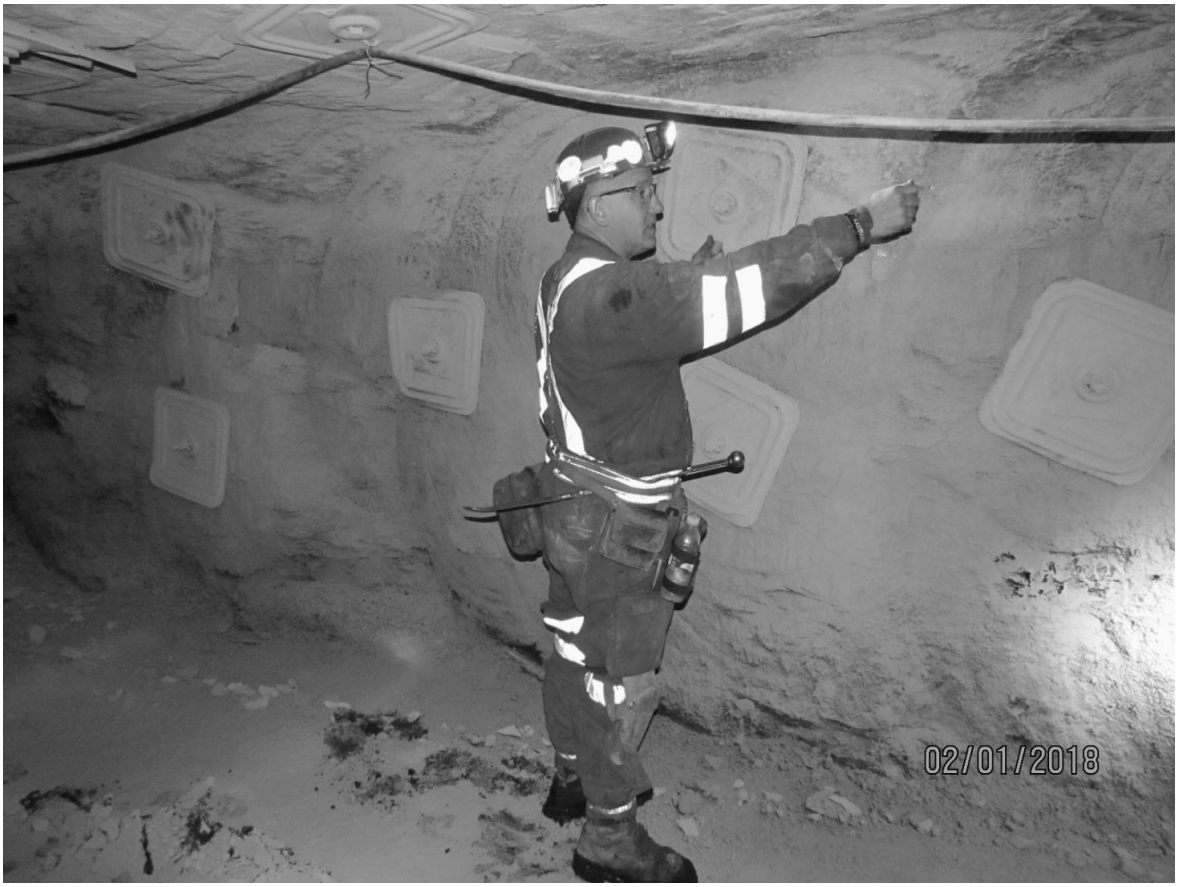
SECTION 4—MINE GASES AND DETECTION DEVICES

All underground mines (except anthracite mines) are gassy. Mine Foremen must know the properties and characteristics of methane, carbon dioxide, and carbon monoxide and must have some knowledge of other mine gases.

Although these gases are characterized by color, taste, odor and combustibility, it is important to know that the weights and volumes of gases change with temperature and barometric pressure. For purposes of comparison, the weights have been calculated at a temperature of 60 degrees Fahrenheit and a pressure of 30.00 inches of mercury, the approximate barometric pressure at sea level.

The specific gravity of a gas is generally defined as the ratio of the weight of a unit volume of gas to the weight of a unit of volume of air at the same temperature and pressure. Thus, the specific gravity of air is one (by definition). If a gas is heavier than an equal volume of air at the same temperature, its specific gravity is greater than one; if it is lighter than air, its specific gravity is less than one.

In addition to the specific gases, there are mixtures of gases (and gases and coal dust) and concentrations to be recognized and remembered. Also, foremen must have an adequate knowledge of detection devices and be trained in the calibration, proper use and maintenance of gas detection devices.



General

1. Q. When is a mine owner or operator required to employ a mine foreman?
   A. When three or more persons work during any part of a 24-hour period.

§45.2-531.A.

2. Q. What articles are prohibited in a mine?
   A. Smoker's articles or matches, lighters, or similar materials generally used for smoker's articles.

§45.2-856.A.

3. Q. What is the penalty for any miner, workman or other persons who smoke, carry or possess any smoker's articles or matches, lighters or similar materials in an underground coal mine?
   A. A violation of this subsection is a Class 6 felony.

§45.2-856.A.

4. Q. How often shall miners entering the mine be searched for smoker's articles?
   A. As required in the smoker search program approved by the Chief to ensure that any person entering the underground area of the mine does not carry smoking materials, matches, or lighters.

§45.2-856.B.

5. Q. What shall be done in mines or sections thereof , before each shift begins work?
   A. Pre-shift examinations shall be conducted.

§45.2-826.A.

6. Q. When shall the Pre-shift examination be made?
   A. Within three hours preceding the beginning of any shift and before anyone on the oncoming shift, other than a mine foreman conducting examinations required by this section, enters any underground area of a mine.

§45.2-826.A.

7. Q. What areas of the mine shall be examined during a Pre-shift examination? A.

   (a) Track entries, and other areas where persons are scheduled to work or travel during the oncoming shift;

   (b) Belt conveyor entries and belt conveyors when used to transport persons;

   (c) Working sections and areas where mechanized mining equipment is being installed or removed, if anyone is scheduled to work on the section or in the area during the on-coming shift. This includes working places, approaches to worked-out areas, and ventilation controls on these sections or in these areas;

   (d) Approaches to worked-out areas along intake air courses if intake air passes by the worked-out area to ventilate working sections where anyone is scheduled to work during the on-coming shift;

   (e) Seals along intake air courses where intake air passes by a seal to ventilate working sections where anyone is scheduled to work during the on-coming shift;

(f) Entries and rooms driven more than twenty feet off an intake air course without a crosscut or more that two crosscuts off an intake air course without permanent ventilation controls, where intake air passes through or by these entries or rooms to a working section where anyone is scheduled to work during the on-coming shift;

(g) Areas where trolley wire will remain energized during the on-coming shift.

§45.2-826.B.

8. Q. Where shall tests for methane and oxygen deficiency be made by the mine foreman during a Pre-shift examination?
   A. In all working places, and all other areas required to be examined by a certified official.

§45.2-826.B.

9. Q. Who is allowed to pass beyond a danger signal at the entrance of a mine to correct or evaluate a mine condition?
   A. Only persons designated by the operator or his agent to correct or evaluate the condition.

§45.2-826.F.

10. Q. What evidence is required that working places have been examined during a Pre-shift examination?
    A. The date, time and initials of the examiner shall be marked at all areas examined.

§45.2-826.G.

11. Q. What is the first thing a worker should do upon reaching the face of any working place at the beginning of the shift?
    A. The worker should look for the date and initials placed by the Pre-shift examiner and visually examine the area for dangerous conditions.

§45.2-826.G.

12. Q. What should a miner do when he fails to find the Pre-shift examiners initials?
    A. Notify the foreman or section foreman.

§45.2-826.G.

13. Q. Who should supervise the removal of unusual, dangerous quantities of methane?
    A. A certified mine foreman.

§45.2-826.H.

14. Q. How shall the mine entrance be marked before a Pre-shift examination has been made following an interruption of the mine fan?
    A. The mine foreman shall place a danger signal or light at the mine entrance.

§45.2-833.G.

15. Q. When may the danger signal at the entrance of a mine be removed?
    A. Only after all areas of the mine required to be examined have been reported safe.

§45.2-833.G.

16. Q. When are workers allowed to enter a mine before it has been determined to be safe?
    A. Only when entrance is necessary to make the mine safe under the direction of a certified mine foreman.

§45.2-826.J.

17. Q. When is it unlawful for a person to enter a mine?
    A. Before it is reported safe, except for those persons already on assigned duty.

§45.2-826.J.

18. Q. Who shall be superior to the mine foreman in the performance of Pre-shift examination duties?
    A. The mine foreman shall have no superior officer while performing these duties.

§45.2-826.M.

19. Q. How often must he mine foreman, or other certified persons designated by him, examine all working places for all hazards?
    A. Once during each coal-producing shift or more often if necessary for safety.

§45.2-827.A.

20. Q. How frequent should working pillar lines be examined in addition to the required Pre-shift examination?
    A. At least once each shift by the mine foreman or other certified person.

§45.2-827.A.

21. Q. What maximum time is a cutting machine, loading machine, roof bolter or continuous miner permitted to work in a mine without an examination for gas?
    A. Twenty minutes or more often if necessary.

§45.2-827.D.

22. Q. What is required before any electric equipment is taken inby the last open crosscut?
    A. All working places shall be examined for methane and found to be safe.

§45.2-827.D.

23. Q. What type of examinations shall be made before taking electrical equipment inby the last open crosscut or before applying power to machinery that remains at or near the face?
    A. Examinations for methane and hazardous conditions.

§45.2-827.D.

24. Q. What is the penalty for any person tampering with methane monitoring devices?
    A. A violation of this subsection is a Class 6 felony.

§45.2-832.

25. Q. What shall the air quality be in all active workings?
    A. (a) Not less than 19.5% oxygen.
    (b) No harmful amount of any noxious or poisonous gas.

§45.2-846.A.

26. Q. Who shall test for methane gas?
    A. Certified or qualified persons trained in the use of approved detection devices.

§45.2-839.A.

27. Q. What action must be taken if a methane concentration of 1.5% is present in a

working place, intake entry or belt conveyor entry or area where mining equipment is being installed or removed?

A. Work shall cease, de-energize power except for intrinsically safe (AMS) circuits and only permit work to reduce the methane concentration to below one percent (1%).

§45.2-839.C.

28. Q. What action must be taken if a methane concentration of 1.5% is present in a working place, intake entry or belt conveyor entry or area where mining equipment is being installed or removed?

A. Only work necessary to reduce the methane concentration to less than 1.5 percent is permitted, and all miners except those required to perform such necessary work shall be withdrawn from the affected area. All electrical power shall be de-energized at the section or applicable power center and the ventilation shall be improved to reduce the methane to less than 1 % . Intrinsically safe (AMS) circuits can remain energized.

§45.2-839.C.

29. Q. What action must be taken if a methane concentration of one percent or more is present in a return or split between the last working place on a working section and the location at which such split of air meets another split of air?

A. All work must cease in the affected area and changes or adjustments to thee ventilation must be made to reduce the methane level to below 1%.

§45.2-839.D.

30. Q. What action must be taken if a methane concentration of one percent or more is present at a location where a return air split is used to ventilate a seal or worked-out area?

A. All work must cease in the affected area and adjustments must be made to reduce the methane level to below 1%.

§45.2-839.D.

31. Q. What shall be done with every worked-out area in a mine?

A. They shall be either sealed or ventilated.

§45.2-845.A.

32. Q. What shall be installed in one or more seals to permit the gases behind the seals to be sampled?

A. Seals shall be fitted with a non-metallic gas sampling pipe, cap or valve.

§45.2-845.B.

33. Q. Who is required to be trained and certified to conduct gas testing in a mine?

A. Every miner working inby the last open crosscut.

§45.2-847.B.

Air

1. Q. What is air?
   A. The mixture of gases surrounding the earth and forming the atmosphere.

MSHA Safety Manual No. 2

2. Q. What are the constituents of pure dry air?
   A. Oxygen (O_2), 20.95%; nitrogen (N_2), 78.08%; carbon dioxide (CO_2), 0.03%; and other rare gases, 0.94%.

MSHA Safety Manual No. 2

3. Q. What is the essential function of air?
   A. To support life and combustion.

MSHA Safety Manual No. 2

4. Q. What is the specific gravity of air?
   A. For the purpose of comparing the weight of other gases to the weight of air, the specific gravity of air is 1.

MSHA Safety Manual No. 2

5. Q. What is meant by the term "humidity"?
   A. The degree to which air is saturated with moisture.

MSHA Safety Manual No. 2

6. Q. What effect does temperature have on the amount of moisture that can be absorbed by air?
   A. As the temperature of air increases, the capacity to absorb moisture increases.

MSHA Safety Manual No. 2

7. Q. What effect does a low outside temperature (below 60°F) have on the humidity of a mine?
   A. As the intake air rises in temperature, it absorbs moisture, tends to dry out the mine, and humidity is reduced.

MSHA Safety Manual No. 19

8. Q. What effect does a high outside temperature (above 60°F) have on the humidity of a mine?
   A. As the intake air-cools, the ability to retain moisture decreases and moisture is deposited in the mine.

MSHA Safety Manual No. 19

9. Q. Which is easier to remove, an accumulation of methane or carbon dioxide?
   A. Methane would be easier to remove because it is lighter than carbon dioxide and diffuses more readily.

MSHA Safety Manual No. 10

10. Q. What is a respirable atmosphere?
    A. An atmosphere suitable for sustaining life.

MSHA Safety Manual No. 2

11. Q. What is an irrespirable atmosphere?

A. An atmosphere unsuitable for sustaining life.

MSHA Safety Manual No. 2

12. Q. What changes occur in the air used to ventilate a mine?
    A. It may mix with methane, carbon dioxide or other mine gases, displace oxygen by absorption or combustion, and either absorb or deposit moisture.

MSHA Safety Manual No. 2

13. Q. What examinations shall be conducted before workers go into idle or worked out areas?
    A. A certified foreman shall examine the area immediately before miners are permitted to enter or work in such areas.

§45.2-827.E.

Methane (CH_4)

1. Q. What is firedamp?
   A. A flammable mixture of methane and air, which will either burn or explode when ignited.

Dictionary of Mining Terms

2. Q. What is the most common explosive gas found in coal mines?
   A. Methane.

Dictionary of Mining Terms

3. Q. What is methane?
   A. A colorless, odorless, tasteless and combustible gas.

Dictionary of Mining Terms

4. Q. What is the source of methane in coal mines?
   A. It is liberated from coal and adjoining rock strata.

Dictionary of Mining Terms

5. Q. Where is methane found?
   A. In almost all coal mines.

Dictionary of Mining Terms

6. Q. What is the composition of methane?
   A. One part carbon and four parts hydrogen (CH_4).

Dictionary of Mining Terms

7. Q. What is the specific gravity of methane?
   A. 0.555

Dictionary of Mining Terms

8. Q. Where is methane usually found in mines?
   A. Along the roof line, in high places, working faces, in dead ends, above roof falls, in cracks called bleeders, and areas where adequate ventilation is not maintained.

Dictionary of Mining Terms

9. Q. Why is methane not explosive by itself?
   A. Oxygen is required to support combustion.

Dictionary of Mining Terms

10. Q. What is the explosion range of methane?
    A. From 5% to 15%.

Dictionary of Mining Terms

11. Q. Why will methane not ignite when the percentage is less than 5%?
    A. Because the heat liberated by combustion is dissipated into surrounding air sufficiently to prevent flame propagation.

MSHA Safety Manual No. 2

12. Q. Why will methane not ignite when the percentage is greater than 15%?
    A. Because the amount of oxygen present is insufficient for rapid combustion to occur.

MSHA Safety Manual No. 2

13. Q. What is the percentage of methane required for maximum explosion violence?
    A. 10%

MSHA Safety Manual No. 2

14. Q. What effect does coal dust in the air have on the explosibility of methane?
    A. A lower explosive limit of methane is decreased when mixed with fine coal dust.

MSHA Safety Manual No. 2

15. Q. How can methane be detected?
    A. By the use of methane detectors, and by analysis.

MSHA Safety Manual No. 2

16. Q. What instrument is used most often in detecting methane?
    A. An approved methane-detecting device.

MSHA Safety Manual No. 2

17. Q. What dangerous gas is most likely to be found near pillar falls?
    A. Methane.

MSHA Safety Manual No. 2

18. Q. What is the percentage of oxygen below, which an explosion of a methane-air mixture cannot occur?
    A. 12%

MSHA Safety Manual No. 2

19. Q. What effect does an atmosphere with reduced oxygen content have on the explosibility of methane?

A. A greater percentage of methane is necessary to start an explosion in an atmosphere that contains less than the normal percentage of oxygen.

MSHA Safety Manual No. 2

20. Q. What effect does the presence of methane have on the explosibility of coal dust?
A. The coal dust is more easily ignited and the force of the explosion is greater.

MSHA Safety Manual No. 2

21. Q. If a split of air of 20,000 cubic feet per minute contains 3% methane, how many cubic feet of air per minute would be required to reduce the methane content to 1%?
A. 60,000 cubic feet per minute
SOLUTION: CFM x CH_4 = CFM x CH_4%

1% = .01 3% = .03

CFM (.01) = 20,000 x .03
CFM (.01) = 600
CFM = 600 ÷ .01
CFM = 60,000

Coal Mine Ventilation Awareness
Program MSHA September 1984

22. Q. If a split of air has 30,000 cubic feet of air per minute and the methane content is 0.5%, how many cubic feet of methane is liberated per minute?
A. 150 cubic feet per minute
SOLUTION: .5% = .005
30,000 x .005 = 150 cubic feet per minute

Coal Mine Ventilation Awareness
Program September 1984

23. Q. If a section of a mine liberates 350 cubic feet of methane per minute, how many cubic feet of air per minute is required to reduce the percentage of methane in the return to 0.75%?
A. 46,667 cubic feet .75 % = .0075
SOLUTION: CFM (air) x .0075 = 350 CFM (methane)

$$\text{CFM (air)} = \frac{\text{350 CFM (methane)}}{\text{.0075 (methane)}}$$

CFM (air) = 46,667

Coal Mine Ventilation Awareness
Program September 1984

Carbon Dioxide (CO_2)

1. Q. What is carbon dioxide (CO_2)?
A. Carbon dioxide is a colorless and odorless gas formed by the chemical combination of carbon and oxygen.

2. Q. How is carbon dioxide formed in a mine?
   A. By combustion, by breathing of humans, by decay of vegetable and animal matter, by the oxidation of coal, and by chemical action of acid water on carbonates.

MSHA Bleeder / Gob Vent. Systems

3. Q. What is a product of complete combustion?
   A. Carbon dioxide.

MSHA Bleeder / Gob Vent. Systems

4. Q. Is carbon dioxide combustible?
   A. No, it is incombustible.

MSHA Bleeder / Gob Vent. Systems

5. Q. Where would carbon dioxide be found in a mine?
   A. Near the mine floor, in low lying areas, in poorly ventilated areas and behind seals.

MSHA Safety Manual No. 2

6. Q. What effect does carbon dioxide have on life?
   A. Lung ventilation is increased as carbon dioxide increases. When 5% of carbon dioxide is present, lung ventilation increases 300%, breathing is laborious, and continued exposure is dangerous.

MSHA Safety Manual No. 2

7. Q. What is the main constituent of the atmosphere known as “blackdamp”?
   A. Carbon dioxide and nitrogen in an oxygen-deficient atmosphere.

MSHA Safety Manual No. 2

8. Q. What is the specific gravity of carbon dioxide?
   A. 1.529

MSHA Bleeder / Gob Vent. Systems

9. Q. How is carbon dioxide detected?
   A. Usually by chemical analysis, approved detectors or test tubes.

Mine Foreman’s Guide – 1985

10. Q. Why is carbon dioxide difficult to remove with ventilation?
    A. Because with a specific gravity of 1.529, carbon dioxide is heavier than air.

MSHA Safety Manual No. 2

Carbon Monoxide (CO)

1. Q. What is carbon monoxide (CO)?
   A. It is a colorless, odorless, tasteless, combustible and poisonous gas.

MSHA Safety Manual No. 2

2. Q. How can carbon monoxide be detected?
   A. By carbon monoxide detectors and by analysis.

MSHA Safety Manual No. 2

3. Q. What is the source of carbon monoxide?
   A. It is the product of incomplete combustion (combustion with an insufficiency of oxygen).

MSHA Safety Manual No. 2

4. Q. When is carbon monoxide most likely to be found in mines?
   A. During a mine fire or after an explosion.

MSHA Safety Manual No. 2

5. Q. What kind of engines produces carbon monoxide?
   A. Internal-combustion engines.

MSHA Safety Manual No. 2

6. Q. What percentage of carbon monoxide will produce symptoms in several hours?
   A. Two hundredths of one percent (0.02%) (200ppm).

MSHA Safety Manual No. 2

7. Q. What percentage of carbon monoxide will produce discomfort in two to three hours?
   A. Four hundredths of one percent (0.04%) (400 ppm).

MSHA Safety Manual No. 2

8. Q. What percentage of carbon monoxide will cause a person to stagger in one and one-half hours?
   A. Eight to twelve hundredths of one percent (0.08% to 0.12%) (800 to 1200 ppm).

MSHA Safety Manual No. 2

9. Q. What percentage of carbon monoxide will cause unconsciousness in 30 minutes?
   A. Twenty to thirty hundredths of one percent (0.20% to 0.30%) (2000 to 3000 ppm).

MSHA Safety Manual No. 2

10. Q. What is afterdamp?
    A. Afterdamp is the atmosphere present following an explosion. The atmosphere contains carbon dioxide, carbon monoxide, decreased oxygen, nitrogen, hydrogen, smoke, and may contain methane.

MSHA Safety Manual No. 2

11. Q. What is the specific gravity of carbon monoxide?
    A. 0.967

MSHA Safety Manual No. 2

12. Q. What is the principal poisonous gas produced by explosives?
    A. Carbon monoxide.

MSHA Safety Manual No. 2

13. Q. What effect does carbon monoxide have on life?
    A. It is extremely poisonous (highly toxic).

MSHA Safety Manual No. 2

14. Q. What is whitedamp?
    A. Carbon monoxide (highly toxic), the most poisonous gas formed by a fire or after an explosion.

MSHA Safety Manual No. 2

15. Q. Why is carbon monoxide dangerous to life?
    A. By combining with the hemoglobin of the blood and excluding oxygen. The hemoglobin of the blood will absorb carbon monoxide 300 times faster than oxygen.

MSHA Safety Manual No. 2

16.Q. What is the explosion range of carbon monoxide?

    A. 12.5% to 74%

MSHA Safety Manual No. 2

Oxygen (O_2)

1. Q. What element in air is essential for life?
   A. Oxygen.

MSHA Safety Manual No. 2

2. Q. What is oxygen?
   A. It is a tasteless, odorless, and colorless gas that supports life and combustion.

MSHA Safety Manual No. 2

3. Q. How does the body receive oxygen?
   A. Air is breathed into the lungs where oxygen is exchanged for carbon dioxide. O_2 is absorbed by the red blood cells and CO_2 is exhaled.

MSHA Safety Manual No. 2

4. Q. What effect does an oxygen deficiency have on life?
   A. Breathing becomes faster and deeper as the oxygen decreases. Atmospheres with less than 16% oxygen are dangerous, and any person entering such atmosphere should wear a respiratory protection device.

MSHA Safety Manual No.2

5. Q. What is the lowest percentage of oxygen that will support the flame of a flame safety lamp?
   A. Approximately 16%.

MSHA Safety Manual No. 2

6. Q. What is blackdamp?

A. An atmosphere deficient in oxygen. Blackdamp usually contains carbon dioxide and nitrogen in an oxygen-deficient atmosphere.

MSHA Safety Manual No. 2

7. Q. What is the specific gravity of oxygen?
   A. 1.105

MSHA Safety Manual No. 2

8. Q. What is the minimum percentage of oxygen required in mine air?
   A. 19.5%

§45.2-846.A.

9. Q. What changes occur to oxygen in an atmosphere of a coal mine?
   A. Part of the oxygen combines with carbon to form carbon dioxide, but a greater part is absorbed by the coal.

MSHA Safety Manual No. 2

10. Q. What chemical change occurs to oxygen when inhaled?
    A. The oxygen combines with the carbon contained in waste products in the body and forms carbon dioxide (CO_2), which is exhaled.

MSHA Safety Manual No. 2

Sulfur Dioxide (SO2)

1. Q. What is sulfur dioxide?
   A. A colorless, suffocating, irritating, poisonous gas.

MSHA Safety Manual No. 2

2. Q. How is sulfur dioxide formed in a mine?
   A. By burning coal containing pyrites.

MSHA Safety Manual No. 2

3. Q. What is the specific gravity of sulfur dioxide?
   A. 2.264

MSHA Safety Manual No. 2

4. Q. What is the main danger of sulfur dioxide?
   A. It is extremely poisonous, even in small amounts.

MSHA Safety Manual No. 2

5. Q. What percentage of sulfur dioxide can cause death?
   A. Five hundredths of one percent (0.05%).

MSHA Safety Manual No. 2

6. Q. How is sulfur dioxide detected?
   A. By the sense of smell and by the effect of sulfur dioxide on the air passages.

MSHA Safety Manual No. 2

7. Q. What is the first effect on a person exposed to sulfur dioxide?
   A. It is extremely irritating and suffocating and is intolerable to breathe.

MSHA Safety Manual No. 2

8. Q. Is sulfur dioxide combustible?
   A. No, it is incombustible.

MSHA Safety Manual No. 2

Hydrogen Sulfide (H_2S)

1. Q. What is hydrogen sulfide?

A. It is a poisonous, combustible, colorless gas that has a sweet taste and an odor like rotten eggs.

MSHA Safety Manual No. 2

2. Q. What mine gas can be detected by its odor?
   A. Hydrogen sulfide.

MSHA Safety Manual No. 2

3. Q. What is the origin of hydrogen sulfide?
   A. It is usually the product of the decomposition of sulfur compounds, the action of acid water on metallic sulfides, and the heating of sulfides in the presence of moisture.

MSHA Safety Manual No. 2

4. Q. What is the explosion range of hydrogen sulfide?
   A. 4% to 44%

MSHA Safety Manual No. 2

5. Q. Is hydrogen sulfide poisonous?
   A. Yes, it is extremely poisonous, even is small amounts.

MSHA Safety Manual No. 2

6. Q. What is the immediate effect of hydrogen sulfide on a person?
   A. It is extremely irritating to the nostrils and eyes and tends to dull the sense of smell.

MSHA Safety Manual No. 2

7. Q. How can hydrogen sulfide be detected other than by the sense of smell?
   A. By a hydrogen sulfide detector or by paper dipped in acetate of lead, which will turn black immediately on exposure to hydrogen sulfide.

MSHA Safety Manual No. 2

8. Q. What is the specific gravity of hydrogen sulfide?
   A. 1.191

MSHA Safety Manual No. 2

9. Q. What is the most violent explosive percentage of hydrogen sulfide?
   A. 14%

MSHA Safety Manual No. 2

10. Q. At what temperature does hydrogen sulfide ignite?
    A. 655°F

MSHA Safety Manual No. 2

11. Q. What percentage of hydrogen sulfide can be fatal if inhaled?
    A. Five hundredths of one percent (0.05%).

MSHA Safety Manual No. 2

Nitrogen (N_2)

1. Q. What is nitrogen?
   A. It is a tasteless, odorless, and colorless gas that will not support life or combustion.

MSHA Safety Manual No. 2

2. Q. Is nitrogen combustible?
   A. No, it is incombustible.

MSHA Safety Manual No. 2

3. Q. What effect does nitrogen have toward propagating an explosion?
   A. None.

MSHA Safety Manual No. 2

4. Q. What effect does nitrogen have on life?
   A. It has no effect except when it replaces oxygen to the extent that there is a deficiency of oxygen.

MSHA Safety Manual No. 2

5. Q. What is the specific gravity of nitrogen?
   A. 0.967

MSHA Safety Manual No. 2

Nitrogen Dioxide (NO_2)

1. Q. What are the first effects of nitrogen dioxide on a person?
   A. It is extremely irritating to the nostrils and eyes.

MSHA Safety Manual No. 2

2. Q. What is nitrogen dioxide?
   A. It is an extremely poisonous gas frequently formed by the burning of high explosives.

MSHA Safety Manual No. 2

3. Q. How may traces of nitrogen dioxide be detected?
   A. A paper soaked in a solution of starch and potassium iodide will turn blue when exposed to nitrogen dioxide. Air sample tubes or chemical analysis may be used to detect nitrogen dioxide.

MSHA Safety Manual No. 2

4. Q. What is the main danger of nitrogen dioxide?
   A. Relatively small quantities may cause death.

MSHA Safety Manual No. 2

5. Q. What is the specific gravity of nitrogen dioxide?
   A. 1.589

MSHA Safety Manual No. 2

Hydrogen (H_2)

1. Q. What is hydrogen?
   A. It is a colorless, odorless, and tasteless gas.

MSHA Safety Manual No. 2

2. Q. How is hydrogen formed in a mine?
   A. It is formed by mine fires, explosions, and charging lead / acid batteries.

MSHA Safety Manual No. 2

3. Q. Is hydrogen explosive?
   A. Yes, it is explosive over a wide range of concentrations.

MSHA Safety Manual No. 2

4. Q. What is the explosion range of hydrogen?
   A. 4.1% to 74%.

MSHA Safety Manual No. 2

5. Q. What is the specific gravity of hydrogen?
   A. It is the lightest of all gases with a specific gravity of 0.07.

MSHA Safety Manual No. 2

6. Q. What is the ignition temperature of hydrogen?
   A. 935°F

MSHA Safety Manual No. 2

7. Q. How is hydrogen detected?
   A. By chemical analysis.

MSHA Safety Manual No. 2

GAS DETECTION TRAINING

When conducting gas detection training you are requested to thoroughly review with the individual the following:

- The properties of mine gases, including discussions on specific gravity & effects of temperature and pressure.
- The list of mine gases with emphasis on methane, oxygen, hydrogen, and carbon dioxide and carbon monoxide.
- Proper procedures for taking a gas test. NOTE: "Hands On" participation by student.
- When and where gas tests are required.
- Procedures when methane is detected in a working place.
- Calibration of gas detection instrument. NOTE: "Hands On" participation by students.
- Duties and responsibilities as a miner under Mine Safety Act.

 §45.2-846

 §45.2-847

 §45.2-848

 §45.2-849

PROPER PROCEDURES FOR TAKING A GAS TEST

√ Check instrument for mechanical condition. (per manufacturer's recommendation)

√ Check battery for proper voltage level. (per manufacturer's recommendation)

√ Check mechanical "zero". (per manufacturer's recommendation)

√ Calibrate (per manufacturer's recommendation) – must be calibrated monthly and more often if needed.

√ Conduct test for methane by activating detector and reading concentrations 12" from mine roof, face, and floor in the area being examined.

√ Avoid holding methane detectors in a bleeder for extended periods of time as this will render the sensor defective.

√ When higher concentrations of methane have been encountered, calibrate your detector as soon as possible.

√ Avoid synthetic fuels when conducting methane checks since these materials can affect readings and damage sensors.

√ Protect methane detectors from water and other adverse environmental conditions.

METHANE TESTS ARE REQUIRED

- Prior to energizing equipment in and inby the last open crosscut
- Prior to taking equipment into working place and at 20 minute intervals
- Prior to cutting and welding and continuously during this activity
- Prior to and after detonation of explosives
- During required examinations:

    1. Pre-shift and On-shift examinations of working places.
    2. Required examinations of immediate returns.
    3. Places where methane is likely to accumulate.
    4. Return side of each set of seals.
    5. Weekly examinations of ventilation and bleeder system.

NOTE: Oxygen Deficiency Tests are required during examinations. If oxygen is below 19.5% by volume, ventilation must be improved. Oxygen tests should be made frequently when approaching or around old works.

WHEN METHANE IS DETECTED IN YOUR WORKING PLACE!!

- At 1% - stop operations, de-energize at the machine breaker and improve ventilation to reduce below 1%.

- At 1.5% or greater – stop operations, de-energize at the source (power center) and withdraw personnel from affected area expect for those needed to improvements to reduce methane levels.

- At 5%+, notify your foreman promptly. This will be treated as an imminent danger situation which could require withdrawal from the mine. Do not attempt to move or ventilate high concentrations of methane unless you are designated to work to correct the problem and then only at the direction of certified persons and following precautions to avoid potential ignition sources.

Gas Detection Chart

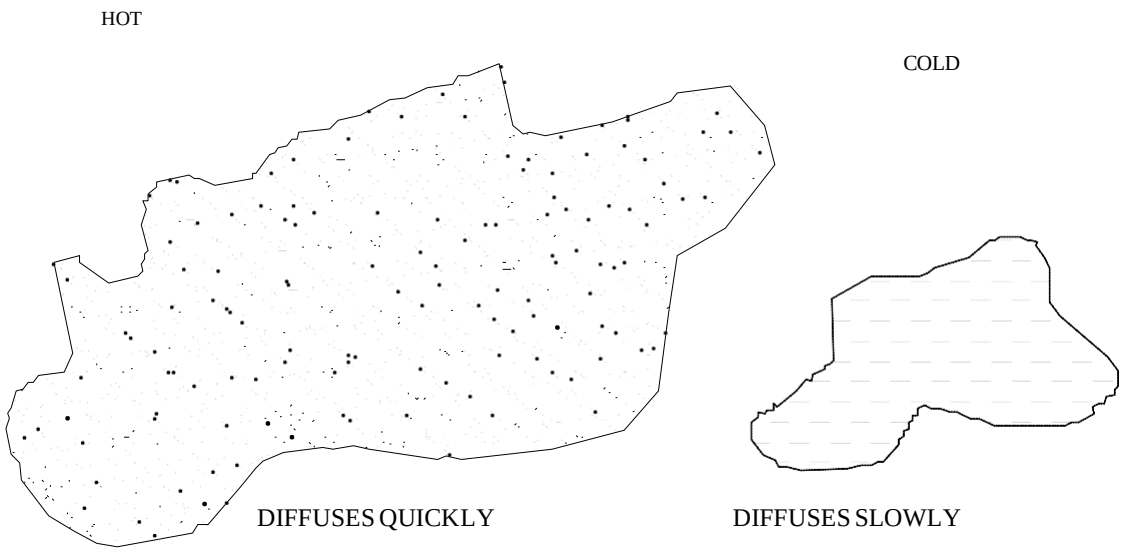
Gas	Detection Methods	When to Test
Oxygen (O_2)	Oxygen indicator. Flame safety lamp. Chemical analysis	During any examination.
Nitrogen (N_2)	Chemical analysis	When an oxygen deficient atmosphere is suspected. In mines where nitrogen issues from rock strata. In inactive areas where ventilation has been inadequate.
Carbon Dioxide (CO_2)	Carbon dioxide detector. Multi-gas detector.	After a fire or explosion. When entering abandoned areas. When reopening sealed areas.
Methane (CH_4)	Methane detector. Chemical analysis	During any examination. When normal ventilation is disrupted. When entering abandoned workings.
Carbon Monoxide (CO)	Carbon monoxide detector. Multi-gas detector. Chemical Analysis.	After a fire or explosion. When entering abandoned areas of the mine. When reopening sealed areas.
Nitrogen Dioxide (NO_2)	Nitrogen dioxide detector. Multi-gas detector. Chemical analysis. Color.	After mine fires or explosions. When diesel equipment is used. After detonation of explosives.
Hydrogen (H_2)	Multi-gas detector. Chemical analysis foam in firefighting	After mine fire or explosion. Near battery charging stations. When steam is produced by water, mist or foam in firefighting.
Hydrogen Sulfide (H_2S)	Hydrogen sulfide detector	In poorly ventilated areas. During unsealing operations. Following mine fires.
Sulfur Dioxide (SO_2)	Multi-gas detectors. Chemical analysis. Odor, taste, and respiratory tract irritation.	When standing water is disturbed.
Heavy Hydrocarbons Ethane (C_2H_6) Butane (C_2H_8) Propane(C_4H_{10})	Multi-gas detector. Chemical analysis.	Following fires or explosions when methane is present. Following accidental entry into adjacent oil or gas well casings.
Acetylene (C_2H_2)	Multi-gas detector, chemical analysis, odor.	Following a methane explosion in air which is low in oxygen or from disruption/opening of acetylene tank.

Mine Gas Chart

Gas	Chemical Symbol	Specific Gravity	Explosive Range	Health Hazards	Solubility	Colors	Odor	Taste
Air	- -	1.000	- -	- -	- -	- -	- -	- -
Oxygen	O_2	1.1054	Supports combustion	-	Moderate	- -	- -	- -
Nitrogen	N	0.9674	- -	Asphyxiation (oxygen depletion)	Slight	- -	- -	- -
Carbon Dioxide	CO_2	1.5241	- -	Increases breathing rate. May cause death in high concentration.	Soluble	- -	- -	Acid in high concentration
Methane	CH_4	0.5545	5 to 15%	Asphyxiant (rare)	Slight	- -	- -	- -
Carbon Monoxide	CO	0.9672	12.5 to 74.2%	Highly toxic. Can be an Asphyxiant.	Slight	- -	- -	- -
Nitrogen Dioxide	NO_2 N_2O_4	1.5894	- -	Highly toxic. Corrosive effect on lungs. May be Asphyxiant.	Slight	Reddish brown	Explosives fumes	Explosives fumes
Hydrogen	H_2	0.0695	4.0 to 74.02% Highly explosive	Asphyxiant (oxygen depletion).	- -	- -	- -	- -
Hydrogen Sulfide	H_2S	1.1906	4.3 to 45.5%	Highly toxic. Can be an Asphyxiant.	Soluble	- -	Rotten eggs	Sweetish
Sulfur Dioxide	SO_2	2.2678	- -	Highly toxic. Can be an sphyxiant.	Highly	- -	Sulfurous	Acid (bitter)
Ethane	C_2H_6	1.0193	3.0 to 12.5%	Asphyxiant (rare)	Slight	- -	- -	- -
Propane	C_3H_8	1.5625	2.12 to 9.35%	Asphyxiant (rare)	Slight	- -	“Carry” in high concentrations	- -
Butane	C_4H_{10}	2.0100	1.86 to 8.41%	Asphyxiant (rare)	Slight	- -	“Carry” in high concentrations	- -
Acetylene	C_2H_2	0.9107	2.5 to 80%	Only slightly toxic. Asphyxiant (rare)	Only slight	- -	- -	Garlic

Effects of Temperature and Pressure on Gas

Effects of Temperature on Gas



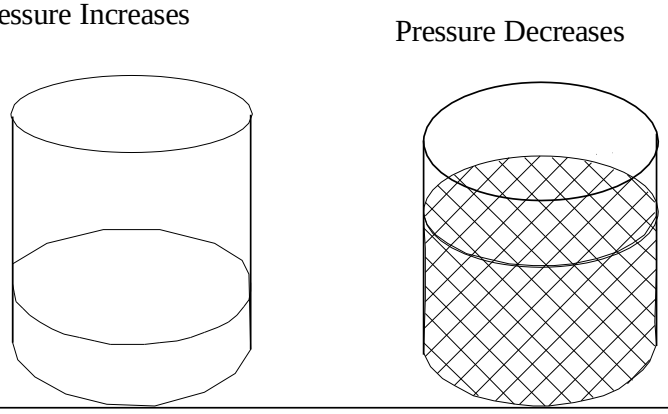
Temperature Increases - Gas Expands

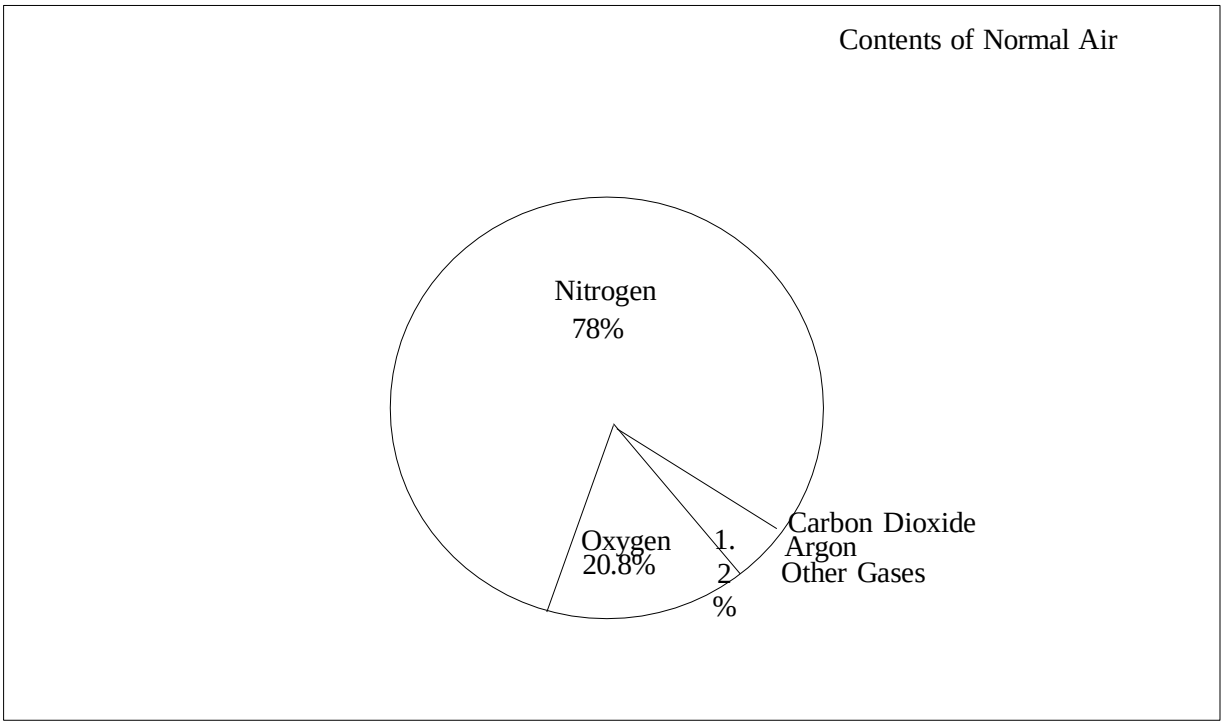
Temperature Decreases - Gas Contracts

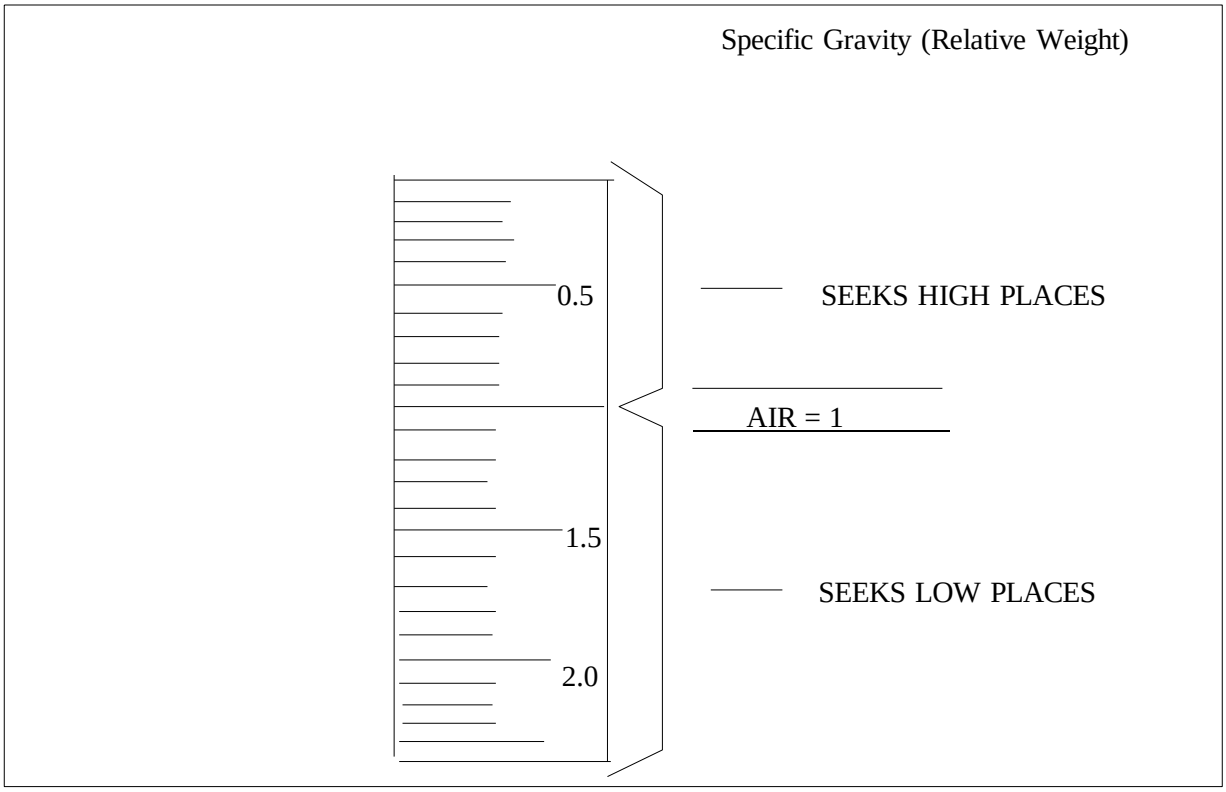
Pressure Increases - Gas Contracts

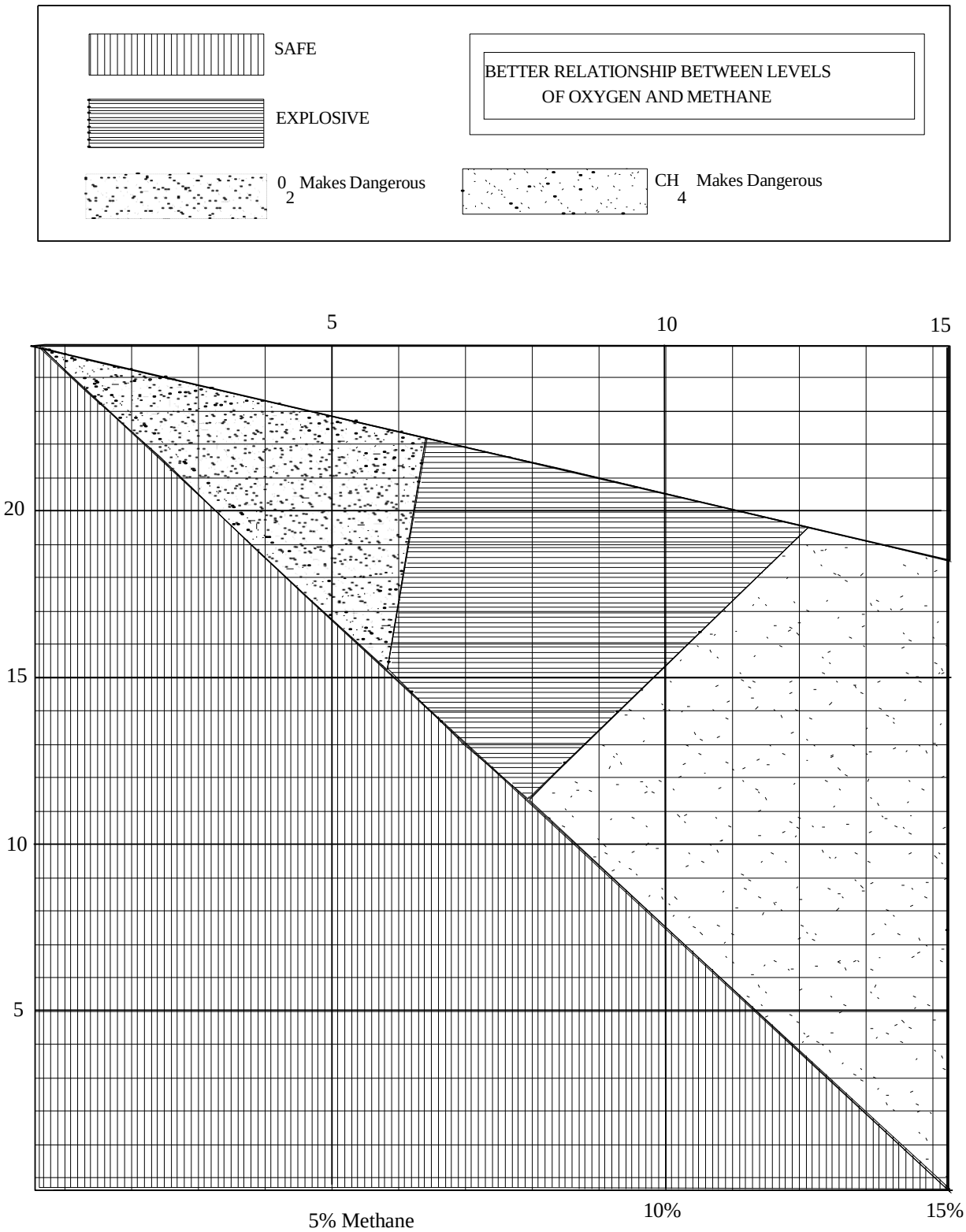
Pressure Decreases - Gas Expands

Effects of Pressure on Gas




Contents of Normal Air
Nitrogen
78%
Oxygen
20.8%
1.
2
%
Carbon Dioxide
Argon
Other Gases


Specific Gravity (Relative Weight)
0.5
1.5
2.0
SEEKS HIGH PLACES
AIR = 1
SEEKS LOW PLACES


SAFE
EXPLOSIVE
BETTER RELATIONSHIP BETWEEN LEVELS OF OXYGEN AND METHANE
0_2 Makes Dangerous
CH_4 Makes Dangerous
5
10
15
20
15
10
5
5% Methane
10%
15%

SECTION 5 - VENTILATION

The purpose of ventilation is to provide fresh air to the workers and to dilute, render harmless, and carry away dangerous gases from the mine. Ventilation is achieved by a mechanically operated fan. Air currents are controlled by stoppings, doors, overcasts, regulators, check curtains, and line brattices. The quantity of air passing through the last open crosscut shall be at least 9000 cubic feet per minute.

The main fan must be of adequate size, be properly installed and positioned to be reversible, and have an alarm. A pressure-recording gauge must be attached to the fan housing to record pressure.

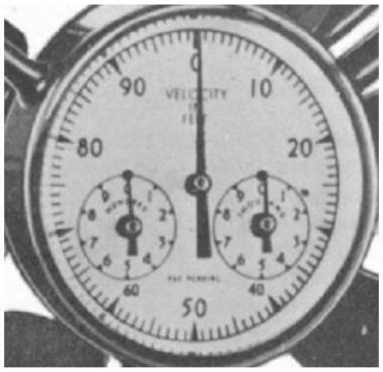
Airways are passageways through which air is circulated to all parts of the mine. Intake, return and belt haulage entries must be separated with permanent stoppings.

Idle and abandoned areas shall be examined weekly. Air passing through idle sections cannot be used to ventilate active working sections unless examined regularly. Abandoned workings must be sealed or ventilated.

Anemometer

DAVIS ANEMOMETER

TAYLOR ANEMOMETER



CLOSE-UP OF TAYLOR ANEMOMETER DIALS

The type of anemometer generally used in coal mining consists of a metal ring within which is set a rotating propeller or blade. The air current striking the inclined blades rotates the vane, the number of revolutions being recorded on the face of the dial by means of a series of gears. The instrument is so calibrated that each revolution of the vane corresponds to one hundred feet of air travel. The instrument is employed to measure the velocity of the air current in mine airways (expressed in feet per minute).

When a reading is taken, an area is selected where the air has a straight course and will not be deflected unequally to either side and where the area of the airway can be measured.

Hold the anemometer at arm's length in such a way that the blade will turn in a plane at right angles to the air current. Using the reset lever on the anemometer, so all dial hands will be on zero, release the brake lever near the handle and expose the anemometer to the air current for one full minute, moving about so as to obtain an average reading for the entire sectional area of the airway, after which the brake is applied. (The reading of the anemometer multiplied by the area of the airway in square feet gives the quantity of air passing in cubic feet per minute.)


DAVIS INSTRUMENT MFG CO
BALTIMORE MARYLAND
MADE IN U.S.A.
BALL
BEARING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BALL
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BALL
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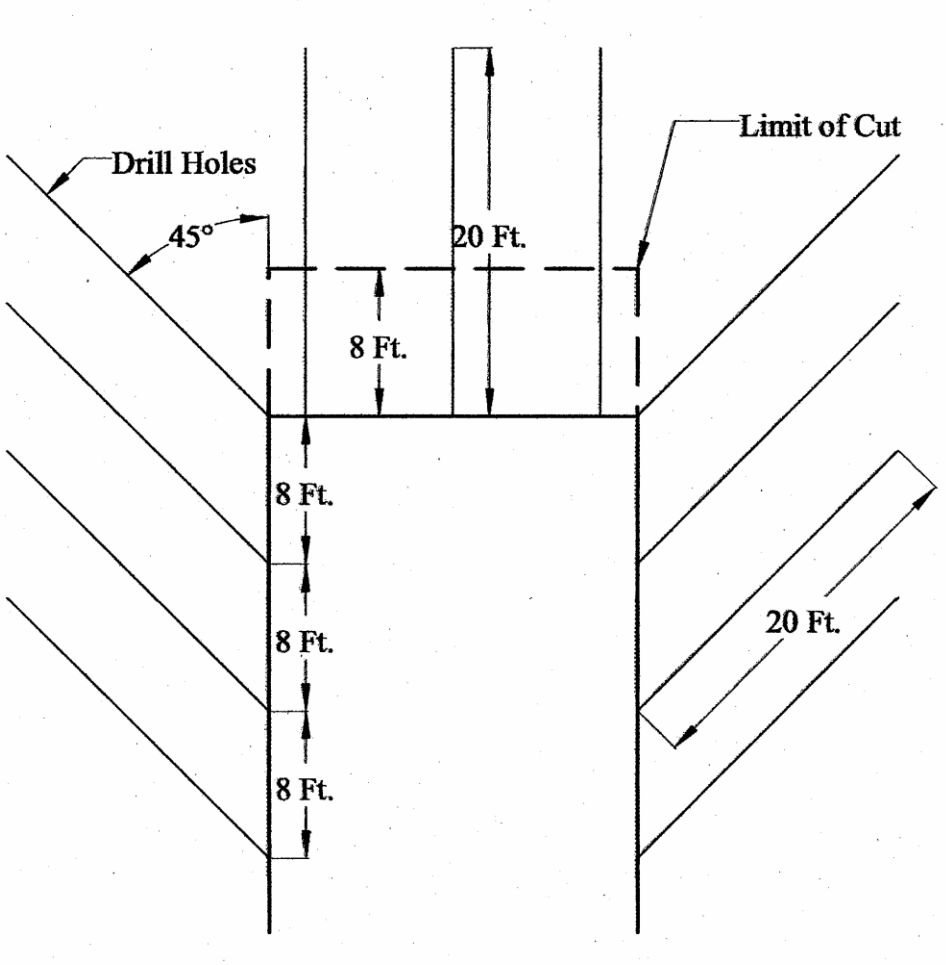
Borehole Drilling

Before drilling a hole through a wall in your home, it would be wise to determine if a live electrical wire is behind the wall. In a similar manner, it is wise for miners to know if they are advancing workings toward an abandoned area or mine, which may contain explosive or noxious gases or water. Penetration into old workings not accurately plotted on a mine map has resulted in several disasters and near misses over the years. These incidents verify the need for accurate and up-to-date maps when a mine advances in the direction of an abandoned mine, or a sealed area.

Section §45.2-708. Requirements for Test Drilling.

Prior to the abandonment of a mine or an area of a mine, surveys must be made and the mine maps updated. Some mining disasters and many near misses have occurred because abandoned mines and sealed areas in the same mine were not mapped accurately.



Fundamentals of Airflow

The principles of airflow are:

1. Airflow in a mine is induced by the pressure difference between intake and exhaust openings.
2. The pressure difference is created by inducing pressure at one point or a series of points in the ventilation system.
3. The pressure created must be great enough to overcome frictional resistance and shock losses.
4. Passageways, both intakes and returns, must be provided to conduct the airflow.
5. Air will always flow from an area of higher to lower pressure.
6. Airflow follows a square-law relationship between volumes and pressures; that is , twice the volume requires four times the pressure.
7. Ventilating pressures, with respect to atmospheric pressures, may be either positive (blowing) or negative (exhausting).
8. The pressure drop for each split leaving from a common point and returning to a common point will be the same regardless of the air quantity flowing in each split.

Pressure Losses

Pressure losses are divided into two separate groups:

1. Friction pressure losses are caused by the resistance of the entry walls on the airstream. Friction losses depend on conditions and roughness of individual entry surfaces and velocity of the air.
2. Shock pressure losses are caused by abrupt changes in the velocity of air movement. Shock losses are the result of changes in air direction, airway area, obstructions, and regulation.

Review of Elementary Fundamentals

Air Quantity – "q" is the amount of air flowing through a mine or an area of a mine in cubic feet per minute. Air quantity is the product of the air velocity times the cross-sectional area of he airway. [q = V x A]

Velocity – "V" is the rate of airflow in linear feet per minute and is measured by anemometers or other instruments or the time it takes for smoke to travel over a measured distance.

Area – "A" is the cross-sectional area of the entry or duct through which the air flows as expressed in square feet.

Perimeter – "O" is the linear distance in feet of the airway perimeter-rubbing surface at right angles to the direction of the airstream.

Airflow – When air flows through an entry and around obstructions without causing eddy currents or turbulence, the flow is called streamline. The rate of streamline flow will be approximately 10 feet per minute or less. Such flow is often referred to as air seepage.

When the air speed is increased, the flow characteristic changes from streamline to turbulent. With turbulent airflow, the energy of air in motion is great enough to bounce air particles off the walls of the containing airway and obstructions while increasing pressure losses due to friction and eddy currents.

Normally, airflow in mine airways and ducts is turbulent.

Pressures – A ventilation pressure is required to cause airflow between points in an air circuit or mine.

The purpose of a fan is to supply mechanically produced pressure at some point in the mine-ventilating circuit or mine. In addition to mechanical pressure, atmospheric pressure also influences airflow in a mine. The algebraic sum of the mechanical pressure and the barometric pressure comprises the mine ventilation pressure.

If the pressure in the mine or duct is at a lower pressure than atmospheric or other base pressure, the system is negative, or exhausting. If the opposite is true, the system is positive, or blowing.

The method of measuring pressures is usually by water gage or other form of differential pressure gage. For special surveys, precision altimeters or barometers are used with the pressure data converted to inches of water gage.

Water Gage – The water gage or standard U-tube is a common instrument that indicates differential pressures in inches of water. The pressure in inches of water can be converted into pounds per square foot, "P", by multiplying the water gage reading by 5.2, the conversion factor.

The conversion factor of 5.2 p.s.f. is derived from the fact that 1 cubic foot of water weighs 62.5 pounds. If one-twelfth of this weight is the weight of 1 inch of water, it is equal to $62.5 \div 12 = 5.2$ p.s.f.

The pressure necessary to move air consists of static, velocity, and when combined, the total pressure.

Static Pressure (SP) : Pressure, either negative or positive, exerted in all directions. May be compared to atmospheric pressure.

Velocity Pressure (VP) : Pressure exerted by kinetic energy of air movement.

Total Pressure (TP) : Algebraic sum of the static pressure and velocity pressure, either negative or positive.

Static Pressure Loss or Regain – The total pressure remains constant except for energy loss caused by airflow. However, the velocity of the airstream will vary with any changes in the area of the airway; consequently, the velocity pressure also will change. With velocity-pressure changes, there must be a corresponding change in the static pressure. For example, if the area doubles in an airway, the air velocity moving through the single airway changes. The velocity automatically will be reduced one-half for the same air quantity; the static pressure theoretically increases, corresponding to the decrease in velocity pressure.

Air Temperature and Psychrometer Data – Mine-air temperatures influence air densities; consequently, air temperatures and the moisture content of the air (relative humidity) must be determined before true air densities can be calculated.

The measuring instrument is a sling psychrometer-an assembly of two thermometers mounted in a frame, equipped with a pivoted handle to whirl the thermometers and obtain the necessary movement of air. The wet bulb of the thermometer used for wet bulb reading is specially covered with muslin, which extends into a water well across the bottom of the psychrometer.

The psychrometer is used by wetting the muslin cover of the wet bulb and then whirling the psychrometer in the airstream. The whirling action causes evaporated cooling of the wet bulb, which lowers the recorded temperature. The dry bulb is not influenced and records the sensible heat of the mine air. By using standard psychrometric tables with wet- and dry-bulb air temperature measurements, the relative humidity can be determined from psychrometric tables or charts.

Barometric Pressure – Barometric pressures are usually recorded in inches of mercury. The standard sea level atmospheric pressure is 14.7 p.s.i. at 29.9 inches mercury. At different elevations above sea level, the barometer reads less since the air column above the instrument is less.

Standard Air Density – The standard density of air for mine ventilation work is considered to be 0.075 p. c.f. This is based upon the weight of 1 cubic foot of dry air at 70 degrees Fahrenheit at a sea level pressure of 29.9 inches mercury.

General

1. Q. What is air velocity?
   A. Velocity is the rate of airflow in linear feet per minute.

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2. Q. What is air quantity?
   A. Air quantity is the amount of air flowing through a mine or segment of a mine measured in cubic feet per minute.

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3. Q. How is airflow created in a mine?

   A. By pressure differences between intake an exhaust openings.

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4. Q. How will the movement of airflow?
   A. From an area of higher to lower pressure.

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5. Q. What are the two systems of ventilation?
   A. Blowing or exhausting.

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6. Q. How may high velocities be avoided?
   A. By the use of airways of adequate cross-sectional area and by splitting the air current.

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7. Q. What must be overcome to pass a ventilating current through a mine?
   A. The mine resistance.

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8. Q. What is mine resistance?
   A. The resistance of the surfaces, bends, and obstructions in the airways to the passage of air.

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9. Q. How does the mine resistance vary in relation to the velocity?
   A. The mine resistance varies as the square of the velocity.

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10. Q. How can the mine resistance be decreased without decreasing the volume of air or changing its course?
    A. By enlarging and cleaning the airways

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11. Q. What effect do constricted airways have on mine resistance?
    A. Constricted airways increase resistance by offering a greater proportion of rubbing surface for the effective area and by requiring increased velocity for a given quantity of air.

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12. Q. What effect do constricted airways have on velocity when the volume of air remains constant?
    A. The velocity is increased in inverse proportion to the area.

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13. Q. What is ventilation pressure?
    A. Pressure necessary to cause air flow between two points.

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14. Q. How is the ventilation pressure measured?
    A. With pressure recording gages and water gages.

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15. Q. How is ventilation pressure varied by fans?

A. The ventilation pressure varies with the speed of the fan. (It also varies with the characteristics of the fan.)

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16. Q. What effect do obstructions in airways have on the quantity of air circulated if the fan speed remains constant?
A. The quantity is decreased.

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17. Q. What is return air?
A. Air that has passed through the last active working place on each split of air or air that which has passed through worked-out areas, whether pillared or non-pillared.

§45.2-501.

18. Q. What is meant by splitting a ventilating current?
A. Dividing the main current into separate individual currents.

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19. Q. What is an air split?
A. A portion of the main ventilating current forming a continuous current throughout a definite part of the mine.

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20. Q. What effect does splitting the air have on mine resistance?
A. The mine resistance is decreased.

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21. Q. What effect does a decrease in mine resistance have on the performance of a fan?
A. The fan is enabled to circulate an increased quantity of air with no increase in the ventilating pressure.

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22. Q. What is the benefit of decreased mine resistance when it is not necessary to increase the quantity of air in circulation?
A. A saving in power that results from increased fan efficiency.

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23. Q. What is the speed of a ventilating current?
A. The velocity.

Dictionary of Mining Terms

24. Q. What effect does cold intake air (low surface temperature) have on the dampness of a mine?

A. As the temperature of the air rises in the mine, moisture is absorbed and the mine surface becomes dry.

Dictionary of Mining Terms

25. Q. What effect does high humidity and high temperature have on persons working?
    A. The heat of the body cannot be dissipated by the evaporation of perspiration and such conditions cause discomfort to the workers.

MSHA Safety Manual No. 19

26. Q. What effect does hot intake air (high surface temperature) have on the dampness of a mine?
    A. As the temperature of the air decreases in the mine, moisture is released and the mine surface becomes wet.

MSHA Safety Manual No. 19

27. Q. What is intake air?
    A. Air that has not passed through the last working place of the split and contains not less than 19.5% oxygen and no hazardous quantities of flammable or harmful gases.

§45.2-501.

28. Q. How many openings are necessary to provide adequate ventilation?
    A. At least two.

§45.2-726.

29. Q. What is the minimum distance permitted between slope and drift openings?
    A. Fifty feet unless otherwise approved by the Chief.

§45.2-727.

30. Q. What is the minimum distance permitted between shaft openings?
    A. Two hundred feet.

§45.2-727.

31. Q. How shall all surface and underground substations, battery charging stations, pump stations, and compressor stations be maintained?
    A. Free of combustible materials and refuse.

§45.2-806.

32. Q. How may rectifiers be ventilated?
    A. They shall be ventilated with intake air.

§45.2-838.C.

33. Q. What attention shall the mine foreman give to the ventilation systems, airways, and travelways of a mine?
    A. He shall ensure that the ventilation appliances are in good condition and that

airways and travelways are safe and open for travel.

§45.2-828.

34. Q. Where shall weekly air readings be measured?
    A. Entering main intakes, leaving main returns, intake end of each pillar line, volume at the intake and return of each split, and the last open crosscut.

§45.2-828.

35. Q. How shall mine ventilation be obtained?
    A. By the use of mechanically operated fans.

§45.2-834.

36. Q. What action shall be taken when the main fan has stopped for more than 15 minutes?
    A. All people shall be removed from the mine; then the main fan shall be operated for a period of time as specified in the approved fan stoppage plan before anyone reenters the mine.

§45.2-834.

37. Q. What action shall be taken before miners are permitted in the mine after a fan stoppage?
    A. Ventilation must be restored and the mine must be thoroughly examined in accordance with the fan stoppage plan.

§45.2-834.

38. Q. Who is authorized to examine a mine after a fan stoppage?
    A. A certified mine foreman.

§45.2-834

39. Q. What action must be taken when 1 percent methane is detected in a face area?
    A. Face work must be stopped, power to face equipment cut off, and employees withdrawn except those persons working to improve ventilation.

§45.2-834.

40. Q. What is the minimum amount of air required in the last open crosscut between intake and return entries?
    A. 9,000 cubic feet per minute.

§45.2-836.

41. Q. How should pillar lines be ventilated?
    A. By keeping the ventilating current along the pillar line.

§45.2-836.

42. Q. What is the purpose of mine ventilation?
    A. To provide sufficient pure air to the employees and to dilute, render harmless, and carry away all dangerous and noxious gases.

§45.2-836.

43. Q. Why should extremely low velocities be avoided?
    A. Low velocities will not readily dilute and carry away smoke from blasting and any flammable or harmful gasses.

§45.2-836.

44. Q. What are the main requirements of an intake opening?
    A. That it be unobstructed and located away from possible sources of contamination to the air.

§45.2-838.

45. Q. What is a common fault of the two-entry system?
    A. Insufficient area and falls restrict the volume of air, increase the resistance, resulting in inefficient ventilation.

§45.2-838.

46. Q. When can ventilation changes be made that materially affect the main air current?
    A. When the mine is not in operation and no miners are in the mine other than those engaged in changing the ventilation.

§45.2-838.

47. Q. When should changes in ventilation be made?
    A. When the mine is idle.

§45.2-838.

48. Q. How many sections can be ventilated with the same split of air?
    A. Only one.

§45.2-838.

49. Q. How must each section in a mine be ventilated?
    A. By a separate split of air.

§45.2-838.

50. Q. What action must be taken when 1.5% methane is detected in an air split immediately returning from a face area?
    A. Face work must be stopped, section power de-energized, and employees withdrawn from the affected area, except those persons working to improve ventilation in the affected area.

§45.2-839.E.

51. Q. Who is allowed in the affected area when work in face areas has stopped because of gas accumulations?
    A. Only employees under the direction of a certified foreman who are working to improve ventilation in the affected area.

§45.2-839.

52. Q. What is the maximum distance allowed between crosscuts?
    A. As specified in the approved roof control plan.

§45.2-840.

53. Q. How is a mine ventilated?
    A. By coursing the air through the intake airways to the working faces and returning it to the surface by the return airways.

§45.2-841.

54. Q. How is the ventilating current controlled?
    A. By the use of stoppings, doors, overcasts, undercasts, regulators, check curtains, and line brattices.

§45.2-842.

55. Q. What means shall be used to ensure positive ventilation in working places where quantities of gas, smoke or dust may be present?
    A. Line brattice or other approved methods of ventilation shall be used.

§45.2-843.

56. Q. Why should a line brattice be used from the last open crosscut to the face in an entry?
    A. To provide adequate ventilation for the workers and to remove gases.

§45.2-843.

57. Q. Through what portions of a mine must the air current not be allowed to pass before reaching working places?
    A. Air must not be permitted to pass through pillared sections, or through abandoned and worked out areas not regularly inspected, before reaching working places.

§45.2-844.

58. Q. What must be the minimum oxygen content in air delivered to all active workings?
    A. 19.5 percent.

§45.2-846.A.

Fans

1. Q. How is the difference in pressure between the intake and the return created?
   A. By differences in temperature, elevation or by mechanical means.

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2. Q. What is meant by natural ventilation?
   A. Movement of air produced by differences in the weight of air columns or by differences in temperature.

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3. Q. How is natural ventilation produced?
   A. By the difference in weight of air due to the difference in temperature between outside air and mine air or by a difference in pressures.

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4. Q. Why is natural ventilation not reliable?
   A. The direction may reverse with weather conditions.

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5. Q. What is meant by the mechanical efficiency of a fan?
   A. It is the ratio of the actual horsepower output in air to the actual horsepower applied to the fan shaft.

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6. Q. For general purposes, what percentage of the power input to the motor can be considered to be applied to the fan shaft?
   A. About 80%.

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7. Q. What is meant by the normal rated capacity of a fan?
   A. It is the capacity specified by the manufacturer for which the best efficiency is obtained.

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8. Q. What causes air to circulate through a mine?
   A. The difference in pressure between the intake and the return.

Bureau of Mines Bulletin 589

9. Q. What is the most reliable means of producing ventilation in a mine?
   A. A mechanically operated fan.

§45.2-833.

10. Q. How many feet from the nearest side of a mine opening shall the main fan be offset?
    A. Not less than 15 feet.

§45.2-833.

11. Q. Where shall mine ventilation fans be installed?
    A. On the surface.

§45.2-833.

12. Q. How must a mine fan installation be protected from an explosion?
    A. By explosion doors or a weak wall.

§45.2-833.

13. Q. What is the purpose of explosion doors?
    A. To relieve the pressure of an explosion before it reaches the fan.

§45.2-833.

14. Q. How must fan buildings be constructed?
    A. Fan buildings must be constructed with incombustible materials, equipped with fireproof air ducts, and provided with explosion doors or a weak wall.

§45.2-833.

15. Q. Where shall fans be located with respect to mine openings?
    A. They shall be offset not less than fifteen feet from the nearest side of the mine opening and connected to the opening by means of air ducts.

§45.2-833.

16. Q. Under what circumstances may a fan be placed in front of or over a mine opening?
    A. When the mine opening is not in a direct line with possible forces coming out of the mine if an explosion occurs and when another opening has explosion doors or a weak wall in direct line of forces coming out of the mine.

§45.2-833.

17. Q. Why should fans not be located in a mine opening?
    A. Because of the possibility of their destruction in the event of a mine explosion.

§45.2-833.

18. Q. Why should mine fans be reversible?
    A. So that the air current can be reversed in case of fire or explosion if this is deemed advisable.

§45.2-833.

19. Q. How are mine fans made reversible?
    A. By an arrangement of air doors in the fan housing or in the mine, or by changing the direction of rotation of the fan discs.

§45.2-833.

20. Q. What arrangements shall be made to ensure uninterrupted mine ventilation?
    A. Main fans shall be on separate power circuits, independent of the main electrical circuit.

§45.2-833.

21. Q. How many feet surrounding main fan installations shall be kept free of combustible material?
    A. 100 feet.

§45.2-833.

22. Q. What electrical requirement is necessary for main fans?
    A. They must be operated from an independent power circuit.

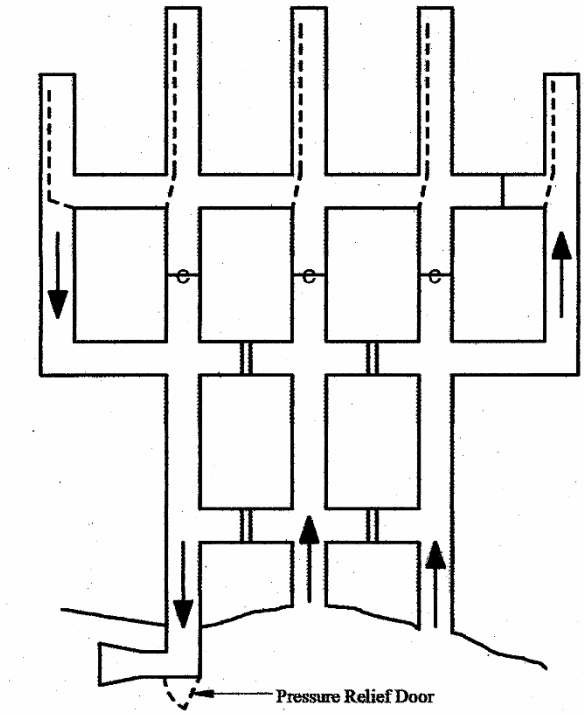
§45.2-833.

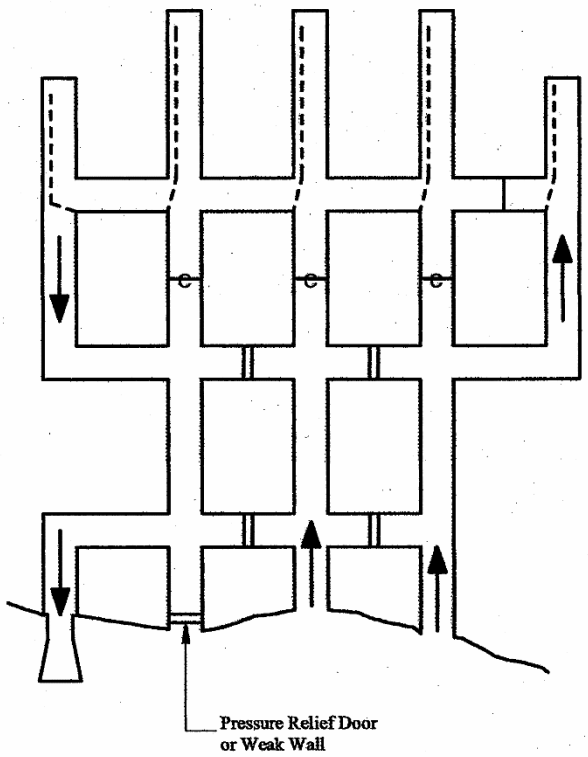
23. Q. What instrument shall be provided on all main fans?
    A. Pressure recording gauges.

§45.2-833.

24. Q. How should man doors at fans be installed?
    A. In pairs to form an air lock.

§45.2-842.

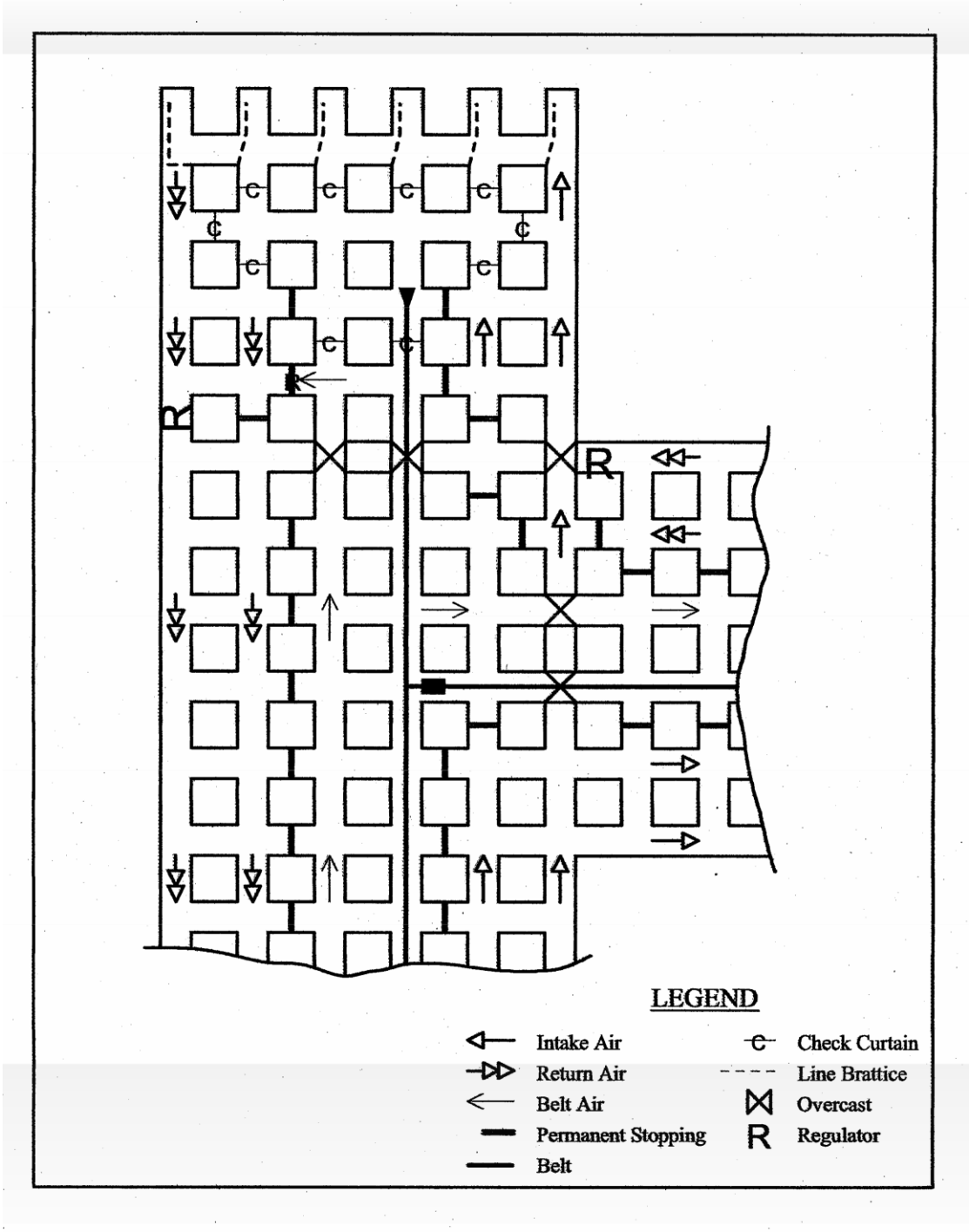




TWO METHODS OF OFFSETTING MAIN MINE FANS

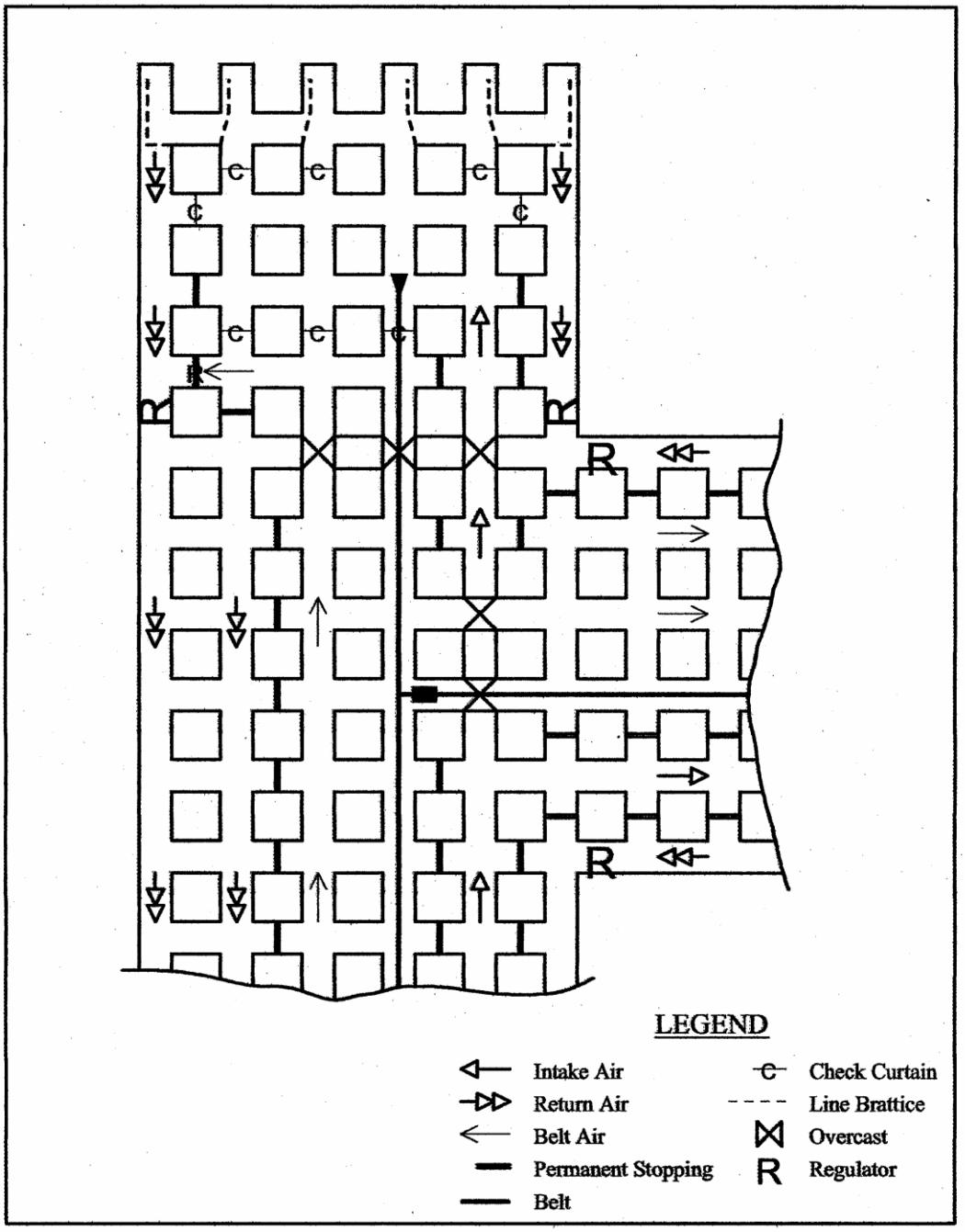
Ventilation Systems

An example of a single split coal mine ventilation system is shown below:



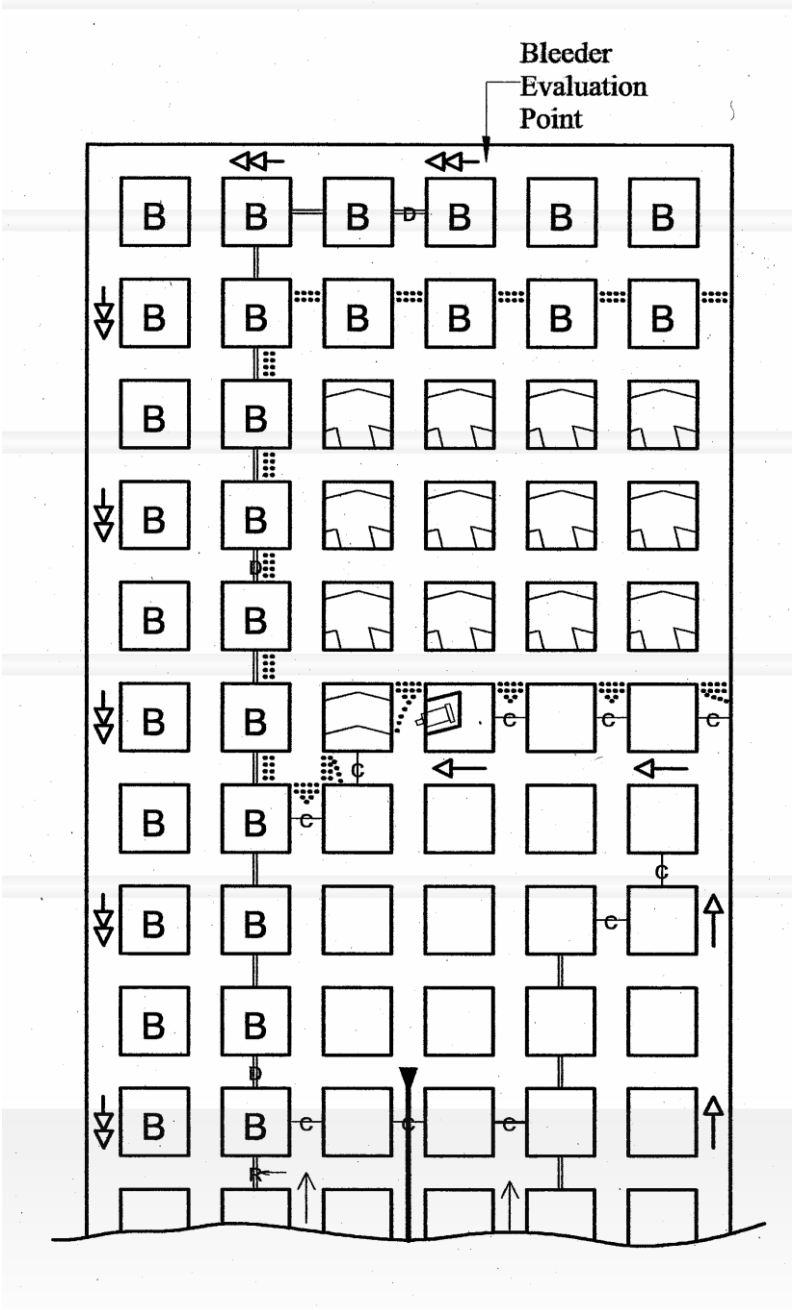
Example of a Single Split Coal Mine ventilation System

Properly Ventilated Mine Using Split Ventilation



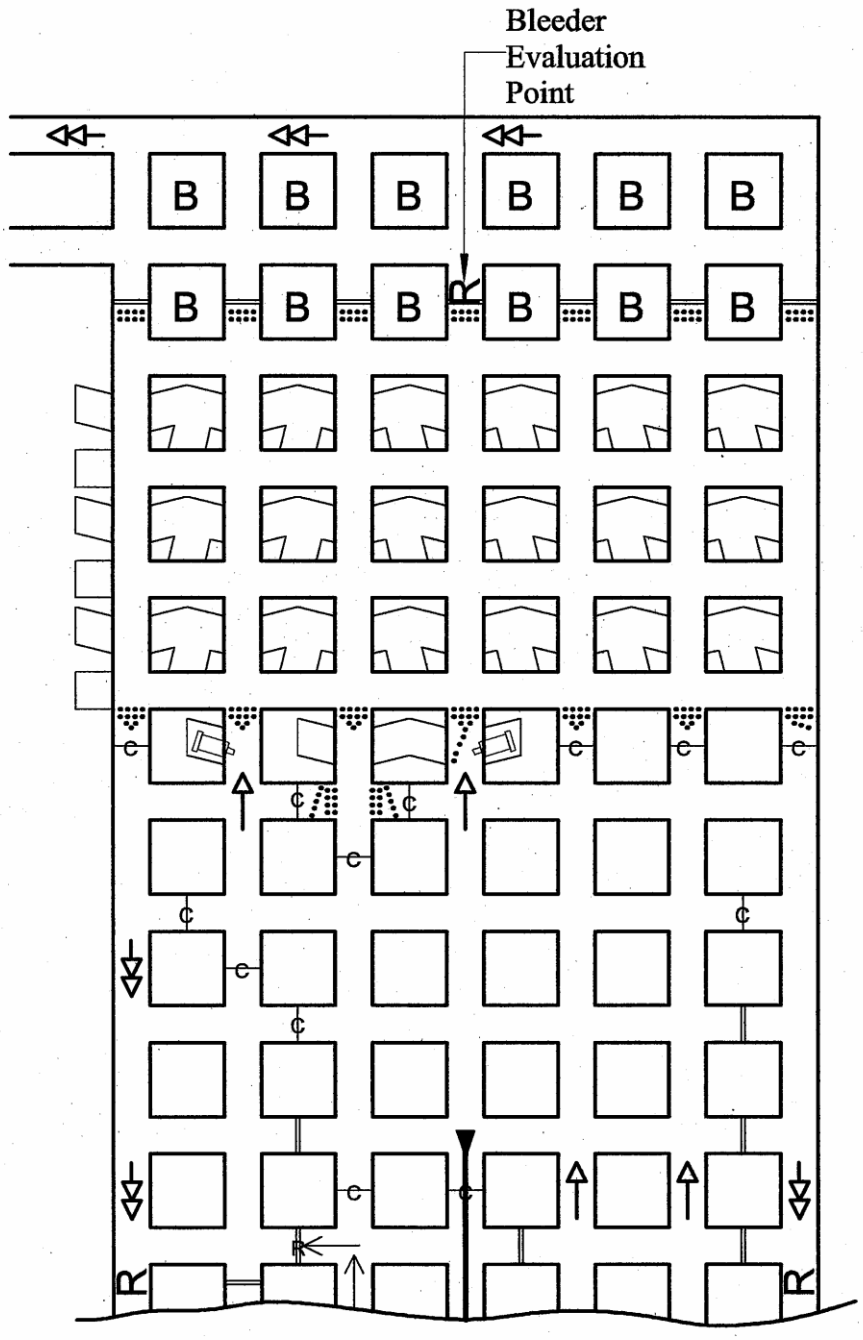
A Plan View Of A Typical Pillar Extraction Section

Showing A Sweep Method Of Ventilation.



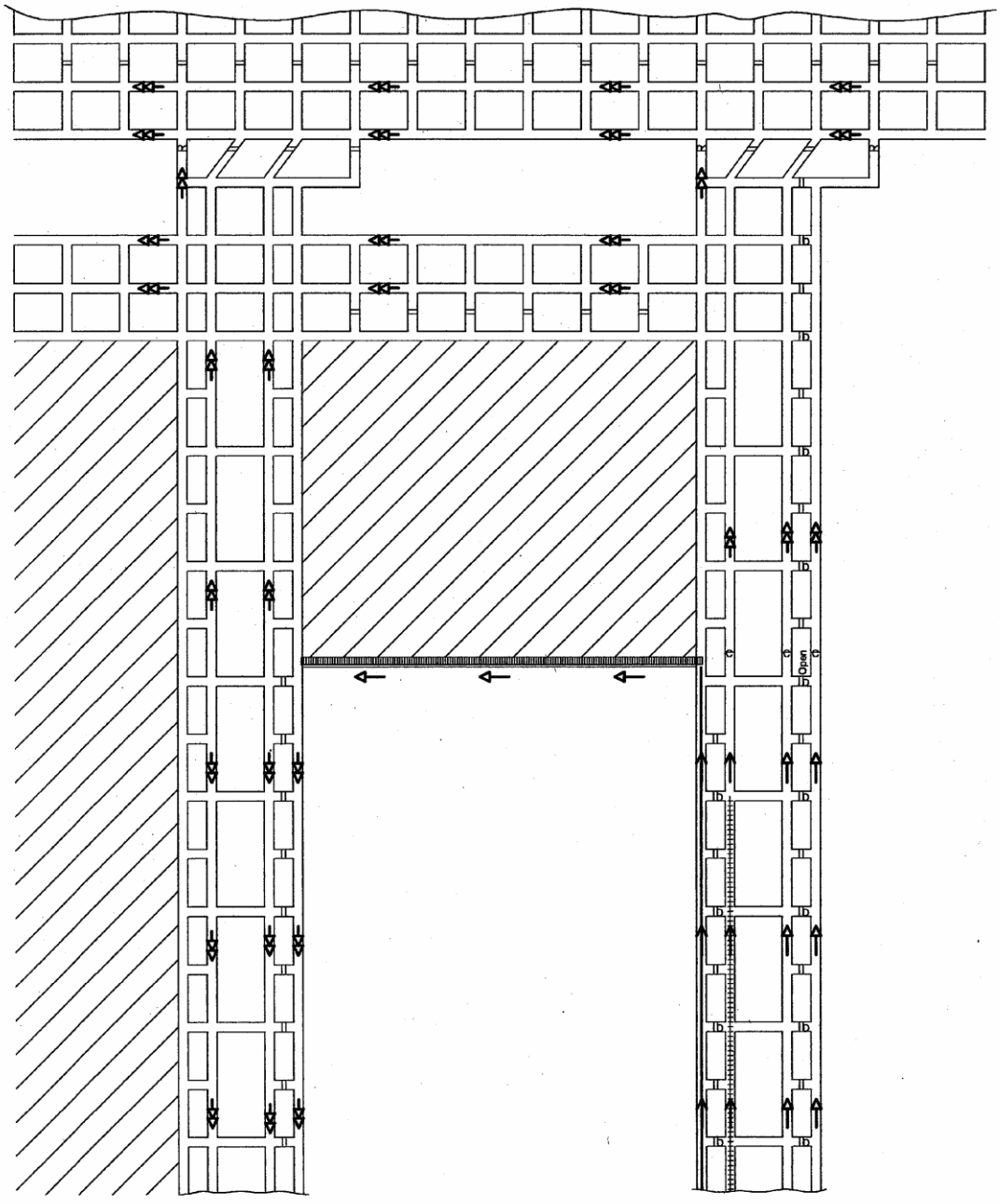
A Plan View Of A Typical Pillar

Extraction Section Showing A Split Method Of Ventilation



Section Ventilation Systems

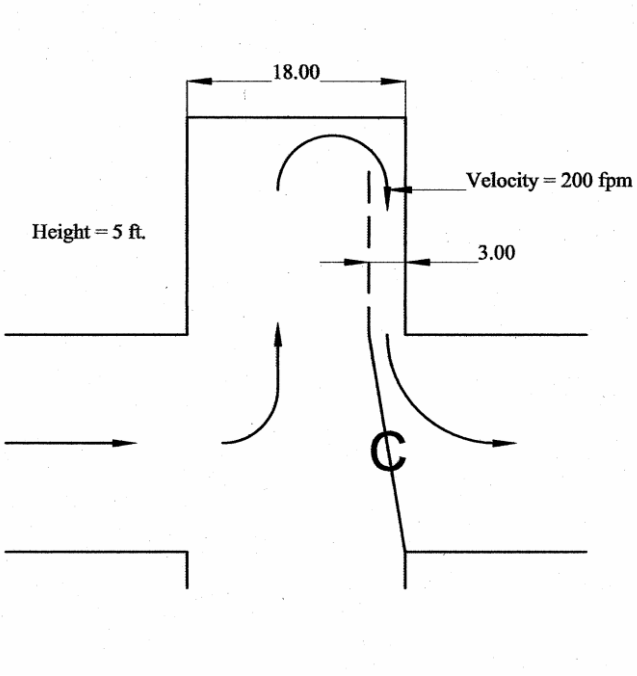
An example of a longwall face ventilation system is shown below:



Mean Air Velocity

SIX-STEP PROCEDURE FOR CALCULATING MEAN ENTRY AIR VELOCITY

Example with line brattice:



Step 1: Area behind line brattice.
A= width x height
A_S= 3ft. x 5ft.= $15ft^2$

Step 2: Air velocity behind line brattice.
Let's assume that we measured
V_S= 200fpm \=200ft./min.

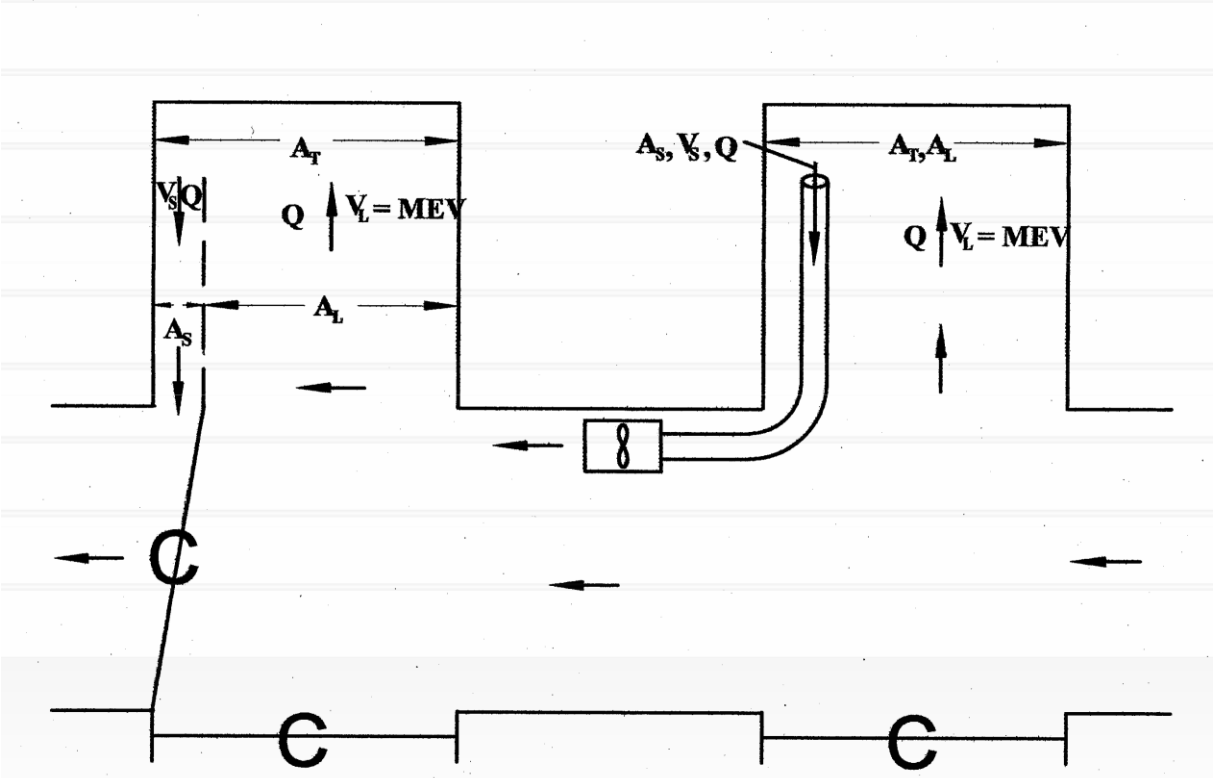
Step 3: Quantity of air.
Q= AxV= $A_S x V_S$= $15ft.^2$ x 200ft./min.= $3000ft.^2$/min.
Q= 3000cfm

Step 4: Total area.
A_T= width x height
A_T= 18ft. x 5ft.= $90ft.^2$

Step 5: Larger area.
$A_L = A_T - A_S$= $90ft.^2 - 15ft.^2$= $75ft.^2$

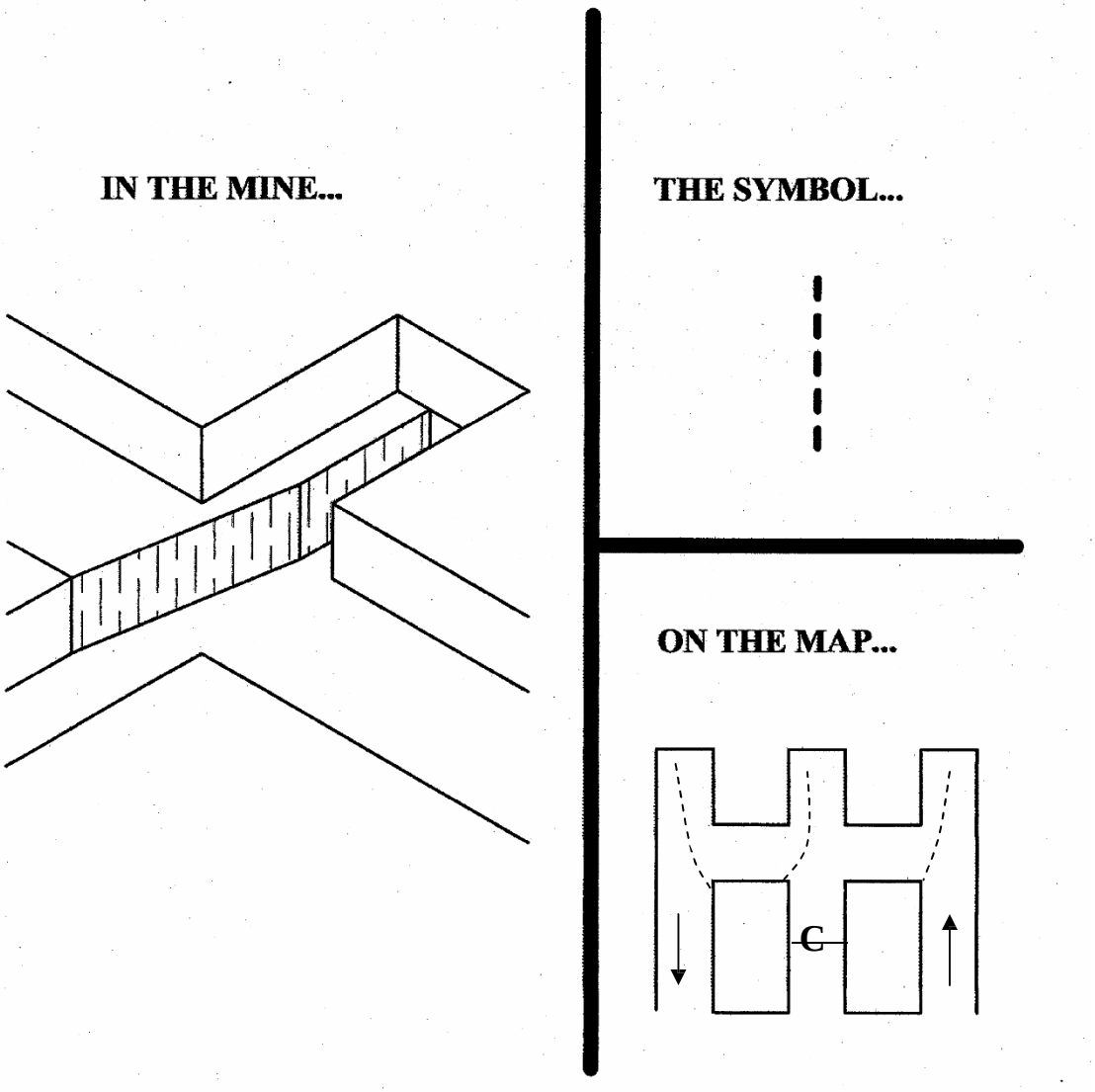
Step 6: Mean entry velocity.
MEV= $V_L = (Q/A_L)$
MEV= ($3000ft.^2$/min./$75ft.^2$)= 40ft./min.

The sketch below shows the physical locations of the various values measured and/or calculated in the six-step determination of mean entry velocity:



Line Brattice

Line brattice is a curtain made of cloth or plastic (material must be flame resistant or incombustible) hung from the roof to the floor and extending from the end of a check curtain to within ten feet of the working face. It can be hung from a rough lumber frame, from timber posts, from the roof bolts, or from special fasteners. Line brattice is used to channel enough air to or from the working face to remove dangerous gases, smoke, and coal dust. It is extended as the mining progresses to keep the air flowing over the machines and the operators.



Line Brattice and Check Curtains

1. Q. What must be obtained before any booster or auxiliary fan can be used underground?
   A. Prior written approval granted by the Chief.

§45.2-835.

2. Q. Where should a line brattice be used?
   A. From the last open crosscut of any room or entry when necessary to provide adequate ventilation for the miners and to remove gases, dust, etc.

§45.2-843.

3. Q. What is line brattice?
   A. It is a curtain erected from the last crosscut along the entry or room to the face.

§45.2-843.

4. Q. What is the purpose of a line brattice?
   A. To provide adequate ventilation for miners and to remove gases, dust, etc.

§45.2-843.

5. Q. How shall the space behind line brattices be maintained?
   A. Large enough to permit the flow of a sufficient volume of air to keep the working face clear of flammable and noxious gases.

§45.2-843.

6. Q. What materials are used for line brattice?
   A. Flame-resistant materials approved by MSHA.

§45.2-843.

Stoppings

1. Q. How do leaky stoppings increase the cost of ventilation?
   A. By requiring the fan to move a greater quantity of air than is necessary to properly ventilate the working faces.

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2. Q. What is the economic effect of airtight stoppings?
   A. Cost is decreased by an increase in the fan operational efficiency.

Bureau of Mines Bulletin 589

3. Q. What are stoppings?
   A. Permanent partitions erected across openings.

Dictionary of Mining Terms

4. Q. What is short-circuiting of air?
   A. Permitting it to enter the return before reaching the desired location.

§45.2-819.

5. Q. What is the purpose of a permanent stopping?
   A. A ventilation control used to direct air and separate the ventilating currents throughout the mine.

§45.2-841.

6. Q. When and where can brattice cloth stoppings be used?
   A. Only temporarily in the last open breakthrough and second breakthrough outby the working face.

§45.2-841.

7. Q. What materials are used to construct stoppings?
   A. Substantial, incombustible material such as concrete, concrete blocks, brick, tile, or other approved materials.

§45.2-841.

8. Q. What type of material shall be used to construct stoppings between intake and return airways not required for the passage of air and equipment?
   A. Incombustible or fire-resistant material.

§45.2-841.

9. Q. What material shall <u>not</u> be used to construct permanent stoppings?
   A. Combustible material and gob.

§45.2-841.

10. Q. What is the principal requirement for permanent stoppings?
    A. They shall be built of substantial, incombustible material.

§45.2-841.

11. Q. What must be done with all workings that are abandoned?
    A. They must be either sealed or ventilated.

§45.2-845.

12. Q. How can the ventilation of large abandoned areas be avoided?
    A. Ventilation of large abandoned areas can be avoided by sealing them. (Open abandoned areas require ventilation and, frequently, the oxygen supplied to such areas combines with carbonates to form carbon dioxide or the oxygen may aid spontaneous combustion. Abandoned areas should be effectively sealed unless they are accessible and can be examined regularly.)

§45.2-845.

13. Q. How must seals be constructed to seal an abandoned area?
    A. In accordance with the sealing provisions of the approved bleeder plan.

§45.2-845.

Overcasts

1. Q. What is an overcast or undercast?
   A. It is an enclosed airway constructed to provide a means for one air current to cross another air current.

§45.2-842.

2. Q. How shall an overcast be constructed and maintained?
   A. They shall be constructed of incombustible material and maintained in good condition.

§45.2-842.

3. Q. How do overcasts aid haulage?
   A. They eliminate the necessity for doors on haulage roads.

§45.2-842.

4. Q. How do overcasts aid ventilation?
   A. They permit frequent splitting of the air, allowing air to pass over only one section or one portion of a mine.

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OVERCAST

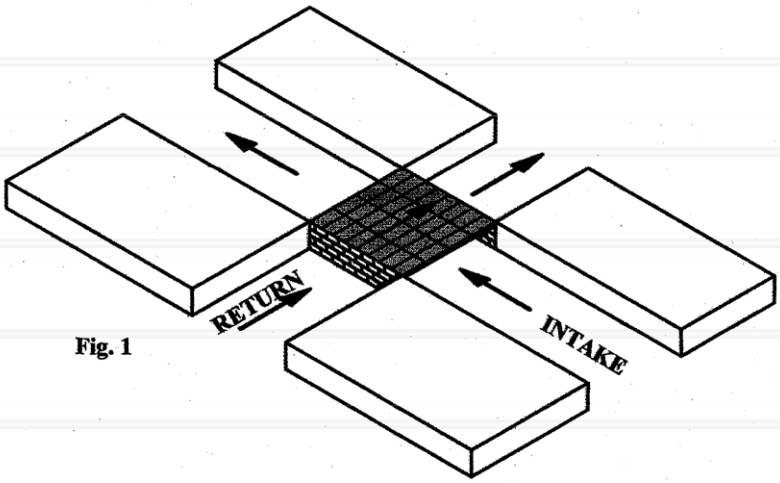


Fig. 1

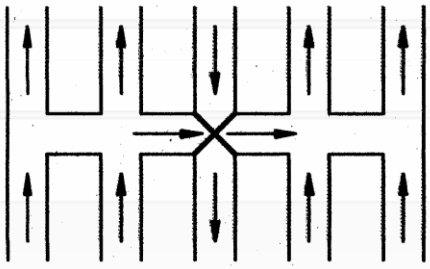


Fig. 2

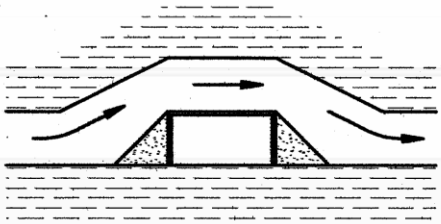
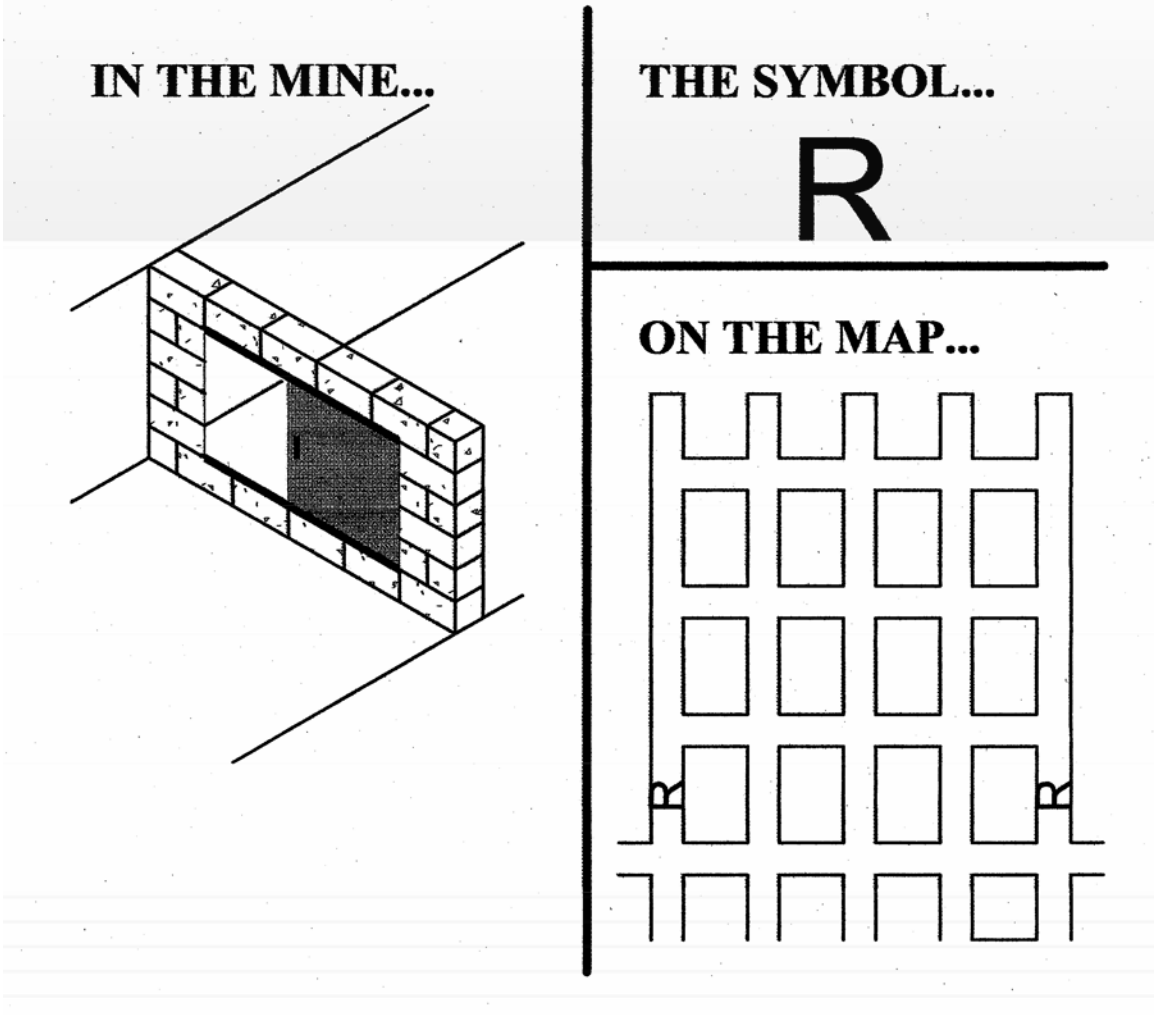


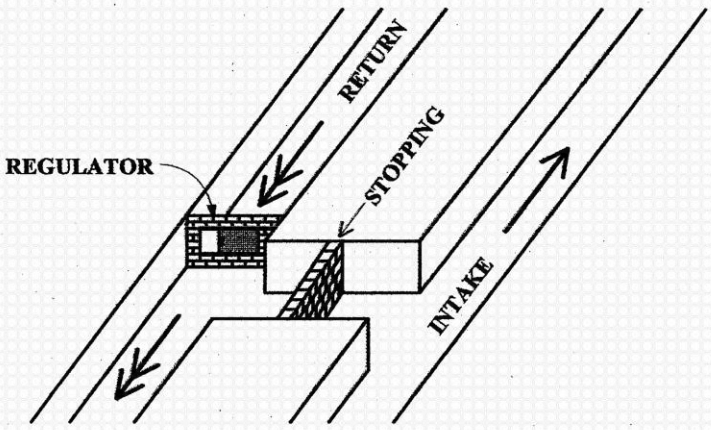
Fig. 3

An overcast is a form of a bridge, which permits one air current to pass over another. Overcasts are normally built in an intersection opposite a breakthrough. (See Figures No. 1 and 2) An overcast permits frequent splitting of the air, allowing air to pass over only one section or one portion of a mine. It also aids the haulage of a mine because it eliminates the necessity for doors on the haulage road. The most common errors made in the construction of an overcast are: rough and abrupt interruption to the ventilating current and insufficient area. The area on the inside of the overcast which abuts up against the construction should be filled in with material and smoothed down so that air will flow easily over the top of the overcast. The distance from the top of the overcast to the roof should be of sufficient area to allow air to pass freely. (See Figure No. 3)

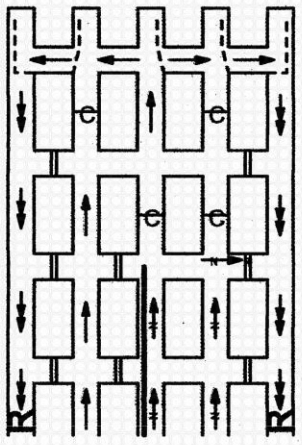
REGULATORS

Regulators are adjustable doors or windows built into a stopping in the return airway near the end of a section. They are used to adjust the mine resistance in a section by opening or closing the door allowing just the right amount of air to flow through the section. Opening a regulator lowers the resistance causing an increase in airflow; closing a regulator increases the resistance causing a decrease in airflow. Regulators are essential to mine ventilation because they proportion the air to meet the needs of each air split.





Plain view of sliding door regulator.

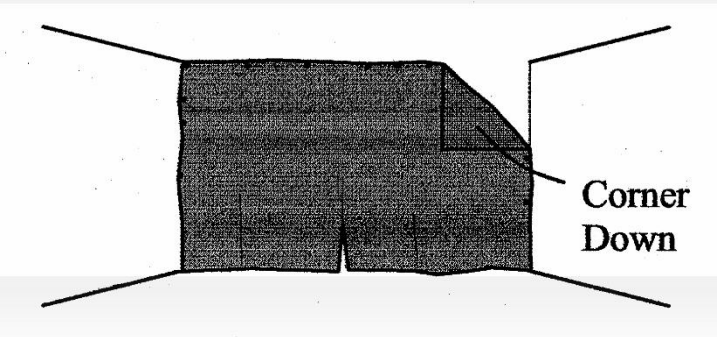


Drawing showing location of regulators.

All regulators are not the neat, permanent type; in fact many regulators are made in very simple, temporary ways.

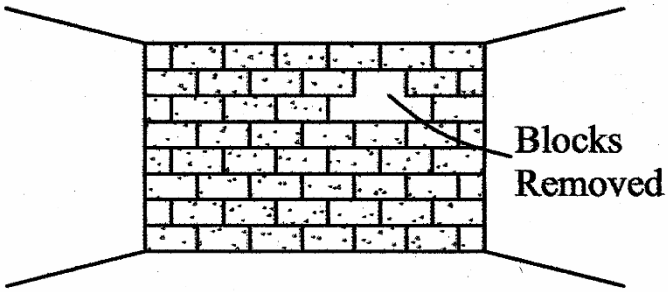
One such regulator is made by simply taking down one corner of a check curtain.

The opening made by the corner lowers the resistance and allows more air to flow. The air flow can be adjusted by lowering the corner more to make a larger opening or tacking it up to make a smaller opening.



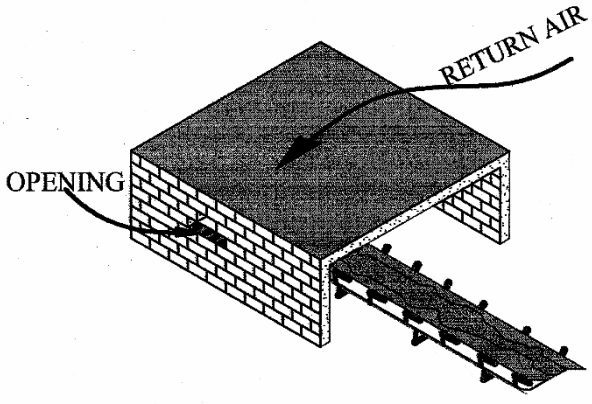
Another type of regulator is made by knocking blocks out of a permanent stopping.

The opening made by the missing blocks lowers the resistance and allows more air to flow. The air flow can be adjusted by removing or replacing blocks.



These types of regulators are very widely used in pillar sections, longwall sections and shortwall sections.

A belt regulator can be made by removing blocks from the wall of an overcast through which a belt is traveling. The blocks are removed from the wall (in the return air passage) away from the return air current.



This belt regulator is sometimes shown on a mine map by a new symbol . . .

. . . the overcast symbol and the regulator symbol combined.

Regulators

1. Q. What is a regulator?
   A. A variable partial obstruction in an airway.

Dictionary of Mining Terms

2. Q. What is the purpose of a regulator?
   A. To control the distribution of the air by regulating the resistance to flow in an air split.

Dictionary of Mining Terms

3. Q. How is a regulator usually constructed?
   A. It usually is a stopping provided with an opening that has a sliding door or other means to regulate the size of the opening.

Dictionary of Mining Terms

4. Q. What is the effect of closing a regulator on the quantity of air entering a split?
   A. The quantity is decreased.

Dictionary of Mining Terms

5. Q. Why are regulators usually placed in a mine?
   A. They proportion the air to meet the requirements of each individual split.

Dictionary of Mining Terms

6. Q. Where are the regulators usually placed in a mine?
   A. In the return entries of each split of air, preferably at the mouth of the section before the air current intersects with another air split.

Dictionary of Mining Terms

Doors

1. Q. How shall man doors in permanent stoppings or overcasts be constructed?
   A. Substantially constructed and properly marked.

§45.2-842.

2. Q. At what intervals shall man doors be provided in permanent stoppings that separate intake, return, and belt entries?
   A. At least every fifth crosscut.

§45.2-842.

3. Q. How far apart should the doors of an air lock be placed?
   A. At a sufficient distance to accommodate equipment.

§45.2-842.

4. Q. Should haulage equipment be permitted to stand in doors or curtains?
   A. No, never.

§45.2-842.

Belt Conveyors and Belt Entry Ventilation

1. Q. What is required where workers cross belts?
   A. Suitable facilities for crossing conveyors shall be provided when it is necessary for miners to cross conveyors.

§45.2-747.

2. Q. What height of clearance should be at loading and unloading points for miners riding belts?
   A. Sufficient height for safe loading and unloading of miners; the area should be well illuminated.

§45.2-763.

3. Q. What is the maximum percentage of methane allowed in belt entries?
   A. Less than 1%.

§45.2-839.

4. Q. How shall stoppings between belt and return entries be constructed?
   A. Stoppings shall be permanent and constructed of incombustible material.

§45.2-841.

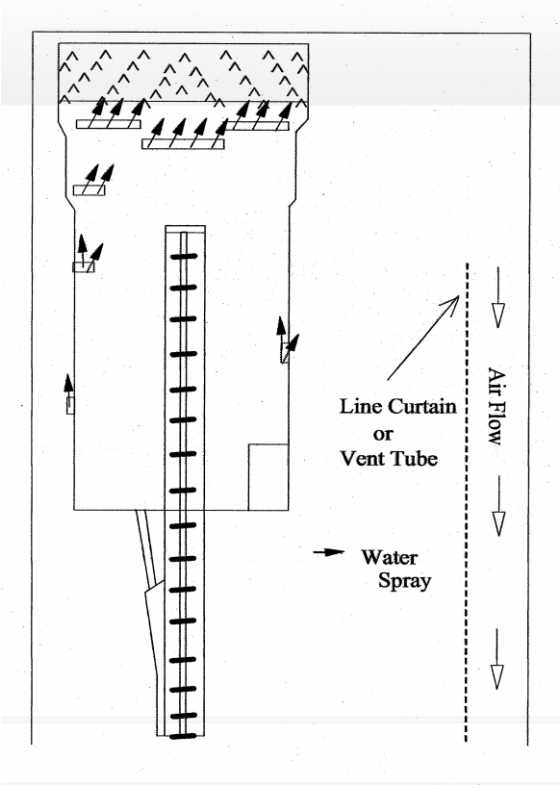
Water Spray Fan Systems

Water spray fan systems are a system of water sprays designed to move air.

Note: As each droplet of water moves through air, it pushes a little air ahead of it and the partial vacuum left by a droplet's passage pulls some more air behind it (a process called "entrainment").

Water spray fan systems have recently become popular.

Note: Water spray fan systems were developed by Foster–Miller Associates under a Bureau of Mines contract.



Typical Water Spray Fan Systems

In ordinary water spray systems, the location and orientation of spray nozzles are chosen to control dust by:

- wetting coal to reduce dust particles
- capturing (knocking down) airborne dust
- keeping dust clouds away from equipment operators

However, ordinary water spray systems are not designed to move the air in any particular direction- ordinary water spray systems only stir-up or mix the air.

Sample Problems

1. Q. What is the area of an airway 3.5 feet high and 21.5 feet wide?
   A. Formula: Area = Height x Width
   3.5 x 21.5 = 75.25
   Area = 75 square feet

   MSHA Inspector Vent. Course, page T-56

2. Q. What is the quantity of air passing through an airway 5 feet high, 20 feet wide, and the velocity is 150 feet per minute.
   A. Formula: Area = Height x Width
   5 x 20 = 100 square feet
   Quantity = Velocity x Area
   Quantity = 150 feet per minute x 100 square feet
   15,000 cubic feet per minute

   MSHA Inspector Vent. Course, page T-57

3. Q. If an airway is passing 20,000 cubic feet of air per minute and the velocity is 125 feet per minute, what is the area?
   A. Formula: Quantity = Velocity x Area
   Area = Quantity ÷ Velocity
   Area = 20,000 cubic feet of air ÷ 125 feet per minute
   Area = 160 square feet

   MSHA Inspector Vent. Course, page T-57

4. Q. If an airway is passing 24,000 cubic feet of air per minute and the area is 80 square feet, what is the velocity?
   A. Formula: Quantity = Area x Velocity
   Velocity = Quantity ÷ Area
   Velocity = 24,000 CFM ÷ 80 square feet
   Velocity = 300 feet per minute

   MSHA Inspector Vent. Course, page T-57

5. Q. If the area of an airway is 90 square feet and the velocity is 200, what is the volume of air per minute?
   A. Formula: Quantity = Area x Velocity
   Quantity = 90 x 200
   Volume = 18,000 CFM

   MSHA Inspector Vent. Course, page T-56

6. Q. What does one inch water gauge equal in pounds pressure per square foot?
   A. Answer: 1 inch water gauge = 5.2 pounds per square foot

Dictionary of Mining Terms, page 1220

7. Q. What is the unit pressure of a 3-1/2 inch water gauge?
   A. Formula: P = (5.2)i
   Pressure per square foot = 5.2 pounds per square foot x water gauge reading
   P = 5.2 x 3.5”
   Pressure = 18.2 pounds per square foot

Dictionary of Mining Terms, page 1220

8. Q. If the pressure is 15.6 pounds per square foot, what is the water gauge reading:]
   A. Formula: P= (5.2)i
   i= 15.6 ÷ 5.2
   i= 3.0” water gauge reading

Dictionary of Mining Terms, page 1220

9. Q. If the water gauge reading is 5 inches, what would be the total pressure of an airway 22 feet wide and 5 feet high?
   A. Formula: TP= PA
   Total Pressure = Pressure per square foot x area of mine airway
   Formula: P = (5.2)i
   P =5.2 x 5
   P = 26 pounds per square foot
   TP = PA
   TP = 26 pounds/square foot x 100 square feet
   = 2,600 Pounds Total Pressure

Dictionary of Mining Terms, page 1220

10. Q. What is the rubbing surface of an entry 4.5 feet high, 20 feet wide, and 5,000 feet long?
    A. Formula: S = LO
    Rubbing Surface = Length of airway x Perimeter
    Perimeter = 2(Width + Height)
    Answer: S = 5,000 feet long x 2(4.5 + 20)
    S = 245,000 square feet of surface the air would rub against

MSHA Inspector Vent. Course

11. Q. What is the perimeter of an airway 4 feet and 3 inches high and 20 feet and 6 inches wide?
    A. Formula: Perimeter = 2(Width + Height)
    P = 2(4.25 + 20.5 feet)
    P = 49.5 Feet

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12. Q. What is the area and perimeter of an airway 4.5 feet high and 22.5 feet wide?
    A. Formula: Area = Width x Height
    A = 4.5 feet x 22.5 feet
    A = 101.25 square feet
    Perimeter = 2(Width + Height)
    P = 2(4.5 feet + 22.5 feet)
    P = 54 feet

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13. Q. What is the weight of a cubic foot of water?
    A. 62.5 pounds.

Coal Mine Ventilation Awareness
Program MSHA September 1984

14. Q. What is the weight of a gallon of water?
    A. 8 pounds.

Coal Mine Ventilation Awareness
Program MSHA September 1984

15. Q. How many gallons of water are contained in a cubic foot?
    A. 7.5 gallons.

Coal Mine Ventilation Awareness
Program MSHA September 1984

16. Q. What is the formula used to calculate the area of a circle?
    A. Formula: Area of circle = $\prod$ x Radius squared
    A = $\prod R^2$
    A = 3.14 R^2

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17. Q. What would be the quantity of air passing through a 9 foot diameter area if the velocity is 200 per minute?
    A. Formula: Area of 9 foot diameter, $\prod$ = 3.14, r = 4.5
    A = 3.14 $(4.5^{2)}$
    A = 63.58 square feet
    Quantity = Area x Velocity
    Q = 63.6 square feet x 200 feet/minute
    Q = 12,720 CFM

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18. Q. What is the formula for calculation circumference of a circle?
    A. Formula: Circumference = $\prod$ (3.14) times diameter (D
    C = $\prod$ D

C = 3.14 D

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19. Q. The diameter of a circle is 8 feet. What is the circumference?
    A. Circumference = ∏ D = 8 x 3.14 = 25.12 square feet

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20. Q. The circumference of a circle is 28.26 feet. What is the diameter?
    A. Diameter = C ÷ ∏ = 28.26 ÷ 3.14 = 9 feet

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21. Q. A split of air has 20,000 cubic feet per minute and a methane content of .8%. How many cubic feet of methane are liberated in 24 hours?
    A. Formula: Cubic feet of methane = Quantity x Percent of methane
    Cubic feet = 20,000 CFM x .008
    Cubic feet = 160 cubic feet of methane/minute
    24 hours = 1,440 minutes
    1,440 minutes x 160 cubic feet =
    230,400 cubic feet of methane in 24 hours

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22. Q. If the return air current is 60,000 cubic feet a minute and methane is .7%, how much air is required to reduce the methane to .4%?
    A. Cubic feet = 60,000 CFM x .007
    = 420 cubic feet
    Quantity = Cubic feet ÷ %CH_4
    Quantity = 420 cubic feet ÷ .004
    Quantity = 105,000 CFM

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23. Q. If a mine liberates 600 cubic feet of methane a minute, how many cubic feet of air will be required to reduce the methane content to .75?
    A. Formula: .75% = .0075
    Quantity = 600 cubic feet of CH_4 ÷ % of CH_4
    Quantity = 600 cubic feet ÷ .0075
    Quantity = 80,000 CFM

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24. Q. If two air splits (one with 18,000 cubic feet of air a minute with 1.5% of methane) (the other with 20,000 CFM and 0.3% methane) come together in the main return, what will be the percentage of methane?
    A. Formula: Cubic feet = 18,000 x 1.5% = 18,000 x .015
    = 270 cubic feet of CH_4 for first split
    Cubic feet = 20,000 x 0.3% = 20,000 x .003
    = 60 cubic feet of CH_4 for the second split

Total cubic feet of CH_4 = 60 + 270 = 330 cubic feet
Total air quantity = 18,000 CFM + 20,000 CFM = 38,000 CFM
% of CH_4 = cubic feet of CH_4 ÷ air quantity
= 330 cubic feet ÷ 38,000
= .0087 or .87% CH_4

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25. Q. If 10 men were barricaded in an area 500 feet long, 20 feet wide, and 5 feet high, how long would they live?
A. Formula: Cubic feet = Length x Width x Height
Cubic feet = 500 feet x 20 feet x 5 feet = 50,000
27 Cubic Feet = 1 Cubic Yard
10 men x 27 cubic feet = 270 cubic feet of air per hour for 10 men
1 man requires 1 cubic yard of air per hour
50,000 cubic feet of air ÷ 270
= 185.2 hours

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26. Q. A sump in a mine 30 feet long, 10 feet wide, and 5 feet deep will contain how many gallons of water?
A. Cubic feet = 30 feet x 10 feet x 5 feet = 1500 cubic feet
1,500 cubic feet x 7.5 gallons/cubic feet
Sump capacity = 11,250 gallons

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27. Q. A sump in a mine 4 feet deep, 30 feet long, and 10 feet wide of water, with 50 gallons of water per minute flowing in, how long will it take to empty the sump with a pump having a capacity of 150 gallons per minute?
A. Formula: Cubic feet = 30 feet x 10 feet x 4 feet
= 1,200 cubic feet
Water in sump = 1,200 cubic feet x 7.5 gallons/cubic feet
= 9,000 gallons
Formula: 9,000 gallons = time (50-150 gallons)
9,000 gallons = time (-100)
9,000 gallons = time (100)
9,000 ÷ 100 = time
90 minutes = time

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28. Q How many tons of coal would be contained in an area 20 feet wide, 5 feet high, and 9 feet deep?
A. Formula: Cubic feet = Length x Height x Width
= 20 feet x 5 feet x 9 feet
= 900 cubic feet
Coal weighs 80 pounds per cubic foot
Tons = 900 x 80 = 72,000 pounds

Tons = 72,000 pounds ÷ 2000 = 36 tons

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29. Q. How much water will a sump hold that is 65 feet long, 8 and 1/2 feet wide, and 6 feet deep?
    A. Solution: Volume = 65 x 8.5 x 6 = 3,315 cubic feet
    Sump capacity = 7.5 x 3,315 = 24,862.5 gallons

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Ventilation Awareness
Foreman's Checklist

[ ] **BE SURE** methane tests are conducted:
- [ ] before equipment is energized at the face.
- [ ] before equipment is trammed to the face.
- [ ] immediately before welding, cutting, soldering.
- [ ] continuously during welding, cutting, soldering.
- [ ] immediately before blasting.
- [ ] after blasting.
- [ ] at least every 20 minutes (or more if necessary when face equipment is operating)

[ ] **BE SURE** methane monitor is operating properly – don't ignore or overlook possible monitor malfunction.

[ ] **DO NOT** enter any areas which have not been examined – especially idle or abandoned areas.

[ ] **REPORT** any noticeable change in air velocity.

[ ] **BE SURE** line brattice or ventilation tubing is kept within 10 feet of the face (or as required in the ventilation plan).

[ ] **REPORT AND/OR REPAIR** any damage to ventilation controls (crushed out stoppings, line brattice, check curtains, etc.).

[ ] **BE SURE** water sprays and diffuser fans (where installed) are operating properly and in use while cutting coal.

[ ] **BE SURE** sufficient area is provided behind line curtains (for sufficient airflow).

[ ] **BE SURE** all air lock doors are kept closed.

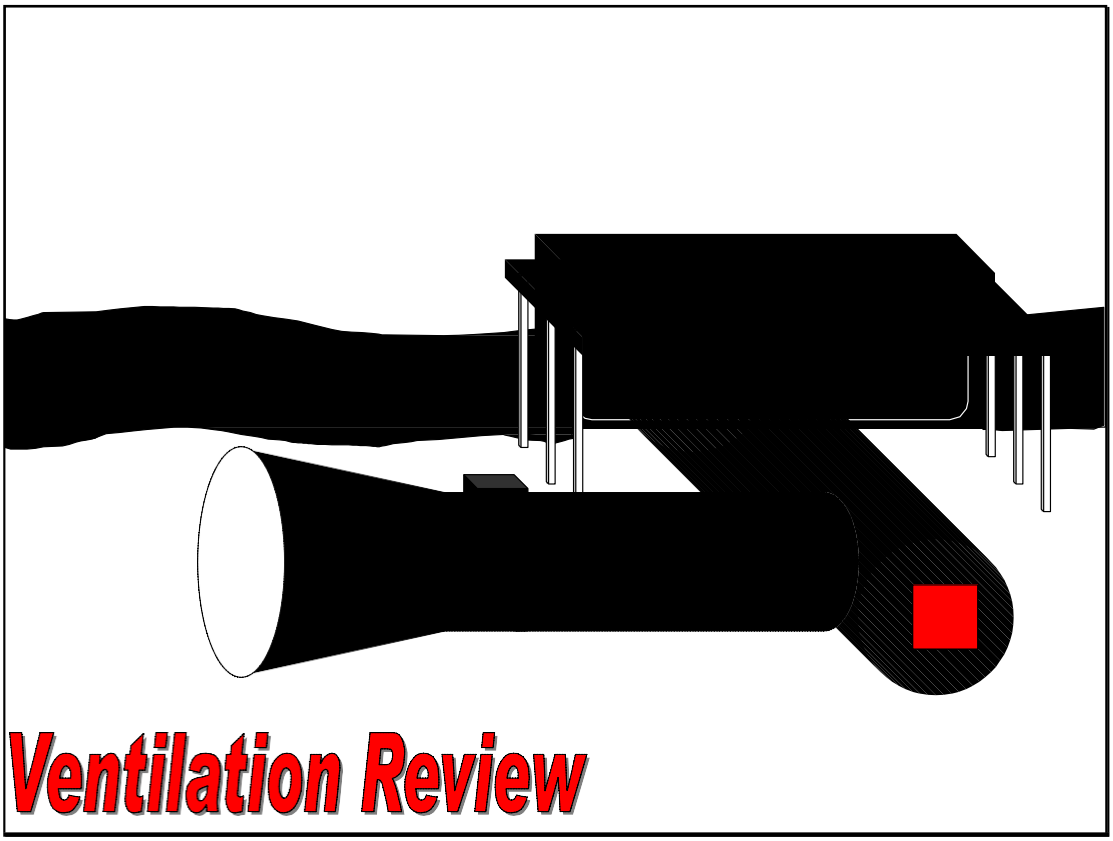
[ ] **DO NOT** change or alter any ventilation control without proper authorization.

[ ] **BE SURE** auxiliary fan is not in use if main fan is not operating.

[ ] **DO NOT** use auxiliary fan to remove methane accumulation – use line brattice.

[ ] **REPORT** unusual hissing sounds (methane gas feeders, ventilation-tubing leaks, etc.).

[ ] **REPORT** strange odors (rotten egg smell, burning sensation in nose/eyes/throat, etc.).



Outline

- Airflow Measurements
  - How to take air readings
  - Measuring areas
  - Mean Entry Air Velocity
- Principals of Airflow
- When and Where to take Air Measurements
- Actions for Excessive Methane

Anemometer

An anemometer is a small sort of windmill with a mechanical counter for recording the number of revolutions caused by the moving air current. It is used to measure air velocities of over 120 feet per minute. There are two types of anemometers:

1) A medium – velocity (or regular) anemometer for measuring velocities from 120 to 2,000 feet per minute: and

2) A high – velocity anemometer for measuring velocities from 2,000 to 10,000 feet per minute.

The anemometer actually measures linear feet of travel and requires timing – usually one minute to determine velocity in feet per minute. Then the area of the airway (where the reading is taken) is computed in square feet. The area is then multiplied by the velocity to obtain the quantity of the air current in cubic feet per minute.

A commonly used method of measuring the velocity in an airway is to traverse the airway so that you get an accurate measurement of the average velocity in the airway. This procedure is as follows:

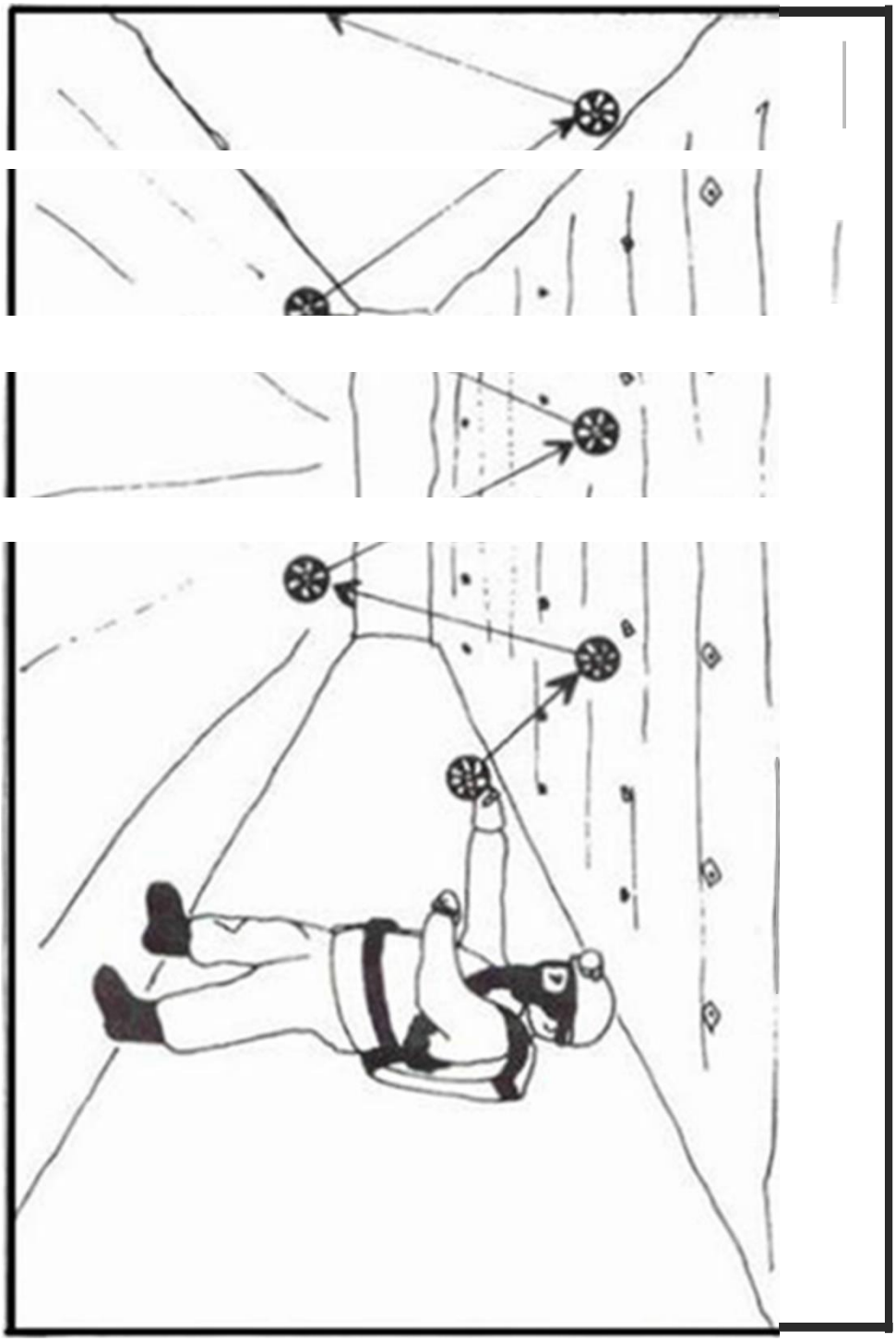
1) Stand with your back to one rib and hold the anemometer in a vertical position out in front of you at full arm's length. The anemometer should be positioned so the air current will enter the back of it (that is, the side without the dials). Your free arm should be kept close to your body.

2) Turn the anemometer on and walk slowly to the opposite rib, pace yourself to get a one minute reading. Be sure to keep the anemometer out in front of you (to decrease resistance as much as possible). The anemometer should be raised and lowered as you walk to the opposite rib so that the average velocity of the air is measured.

3) At the end of one minute, turn off the anemometer and read the dials. This reading will have to be corrected by using the table of corrections for the various velocity readings.

4) Determine the cross-sectional area of the entry by multiplying the width times the height.

5) Calculate the quantity of airflow in cubic feet per minute by multiplying the area ($ft.^2$) by the corrected velocity (feet/minute)



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DETERMING THE CORRECTION FACTOR

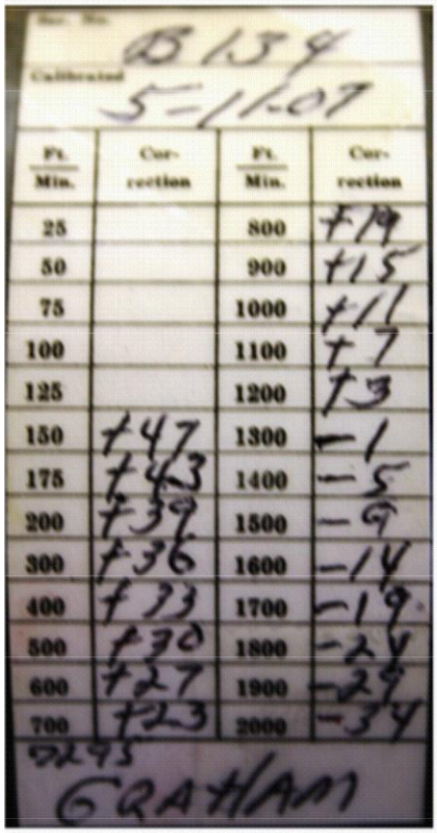
You have a reading of 434 on your anemometer?
You look at the correction factors on your anemometer and beside 400 the correction is +28.
Beside 500 the correction factor is +24.
500 minus 400 = 100 the difference between the two closest correction factor to the reading you got with the anemometer.
500 minus 434 = 66 the difference between the largest number having a correction factor beside it
66 divided by 100 = 0.66 the percentage of the compared to the difference between the two correction factors
+28 minus +24 = 4 total amount of difference between the largest correction factor and the lowest correction factor
0.66 X 4 = 2.64 correction needed to get the answer
+24 + 2.64 = 26.64 which equals 27 lowest correction factor added to the correction needed to get the answer.
Therefore the corrected reading is 434 + 27 = 461

Next:
You have a reading of 168 on your anemometer?
You look at the correction factors on your anemometer and beside 150 the correction is +51
Beside 175 on the correction chart the correction factor is +47.
175 minus 150 = 25 the difference between the two closest correction factor to the reading you got with the anemometer.
175 minus 168 = 7 the difference between the largest number having a correction factor beside it
7 divided by 25 = 0.28 the percentage of the compared to the difference between the two correction factors
+51 minus +47 = 4 total amount of difference between the largest correction factor and the lowest correction factor
0.28 X 4 = 1.12 correction needed to get the answer
+47 + 1.12 = 48.12 which equals 48 lowest correction factor added to the correction needed to get the answer. Therefore your corrected reading is 168 + 48 = 216

Next:
You have a reading of 1834 on your anemometer?
You look at the correction factors on your anemometer and beside 1800 the correction is -29
Beside 1900 on the correction chart the correction factor is -34.
1900 minus 1800 = 100 the difference between the two closest correction factor to the reading you got with the anemometer.
1900 minus 1834 = 66 the difference between the largest number having a correction factor beside it
66 divided by 100 = 0.66 the percentage of the compared to the difference between the two correction factors

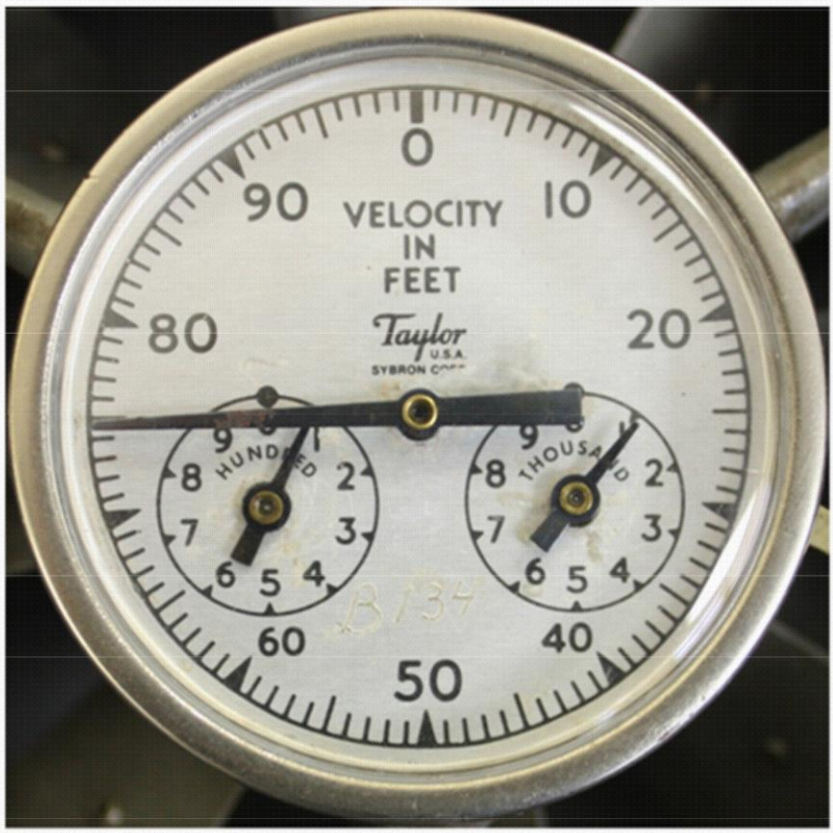
BELOW ARE THREE ANEMOMETER READINGS AND CORRECTION CHART.
USING THE A HEIGHT OF 6 FEET AND A WIDTH OF 20 FEET PLEASE CALCULATE THE AMOUNT OF AIR TRAVELING DOWN THE MINE ENTRY.

ANEMOMETER EXERCISE # 1


B 139
Calibrated 5-1-07

Ft. Min.	Correction	Ft. Min.	Correction
25		800	+19
50		900	+15
75		1000	+11
100		1100	+7
125		1200	+3
150	+47	1300	-1
175	+43	1400	-5
200	+39	1500	-9
300	+36	1600	-14
400	+33	1700	-19
500	+30	1800	-24
600	+27	1900	-29
700	+23	2000	-34

0293
GRAHAM



ENTRY IS _____ FEET HIGH

ENTRY IS _____ FEET WIDE

ANEMOMETER READING = _____ FEET PER MINUTE

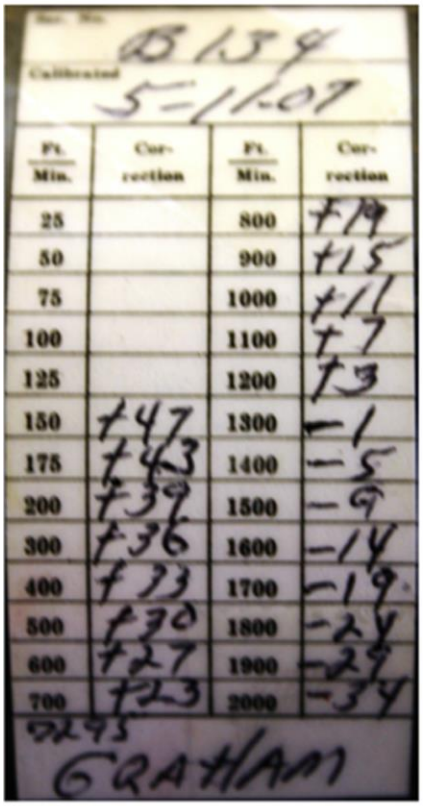
CORRECTION = _____ FEET PER MINUTE

CORRECTED READING = _____ FEET PER MINUTE

WIDTH _____ X HEIGHT _____ = AREA _____ SQUARE FEET

CORRECTED READING _____ X AREA _____ = CUBIC FEET PER MINUTE

ANEMOMETER EXERCISE # 2



Ft. Min.	Correction	Ft. Min.	Correction
25		800	+19
50		900	+15
75		1000	+11
100		1100	+7
125		1200	+3
150	+47	1300	−1
175	+43	1400	−5
200	+39	1500	−9
300	+36	1600	−14
400	+33	1700	−19
500	+30	1800	−24
600	+27	1900	−29
700	+23	2000	−34

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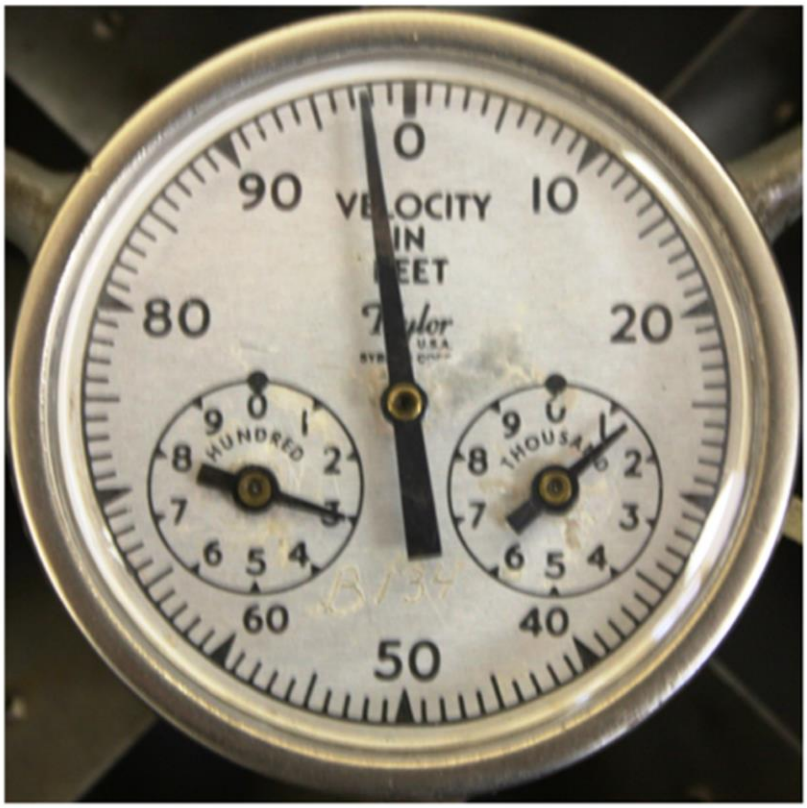


ENTRY IS _____ FEET HIGH

ENTRY IS _____ FEET WIDE

ANEMOMETER READING = _____ FEET PER MINUTE

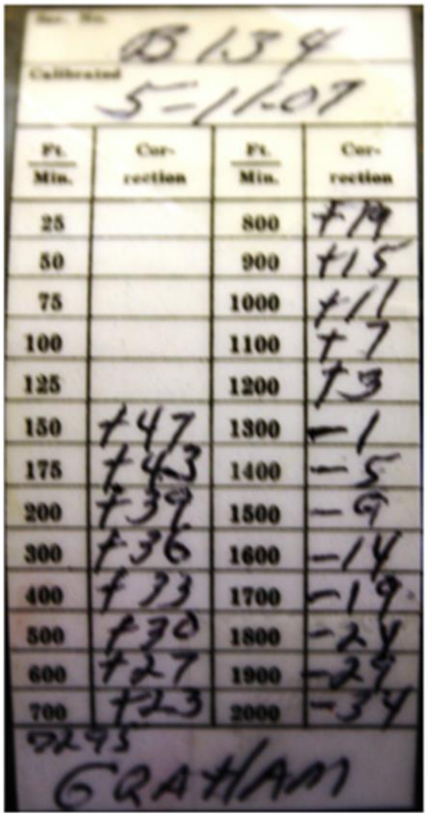
CORRECTION = _____ FEET PER MINUTE

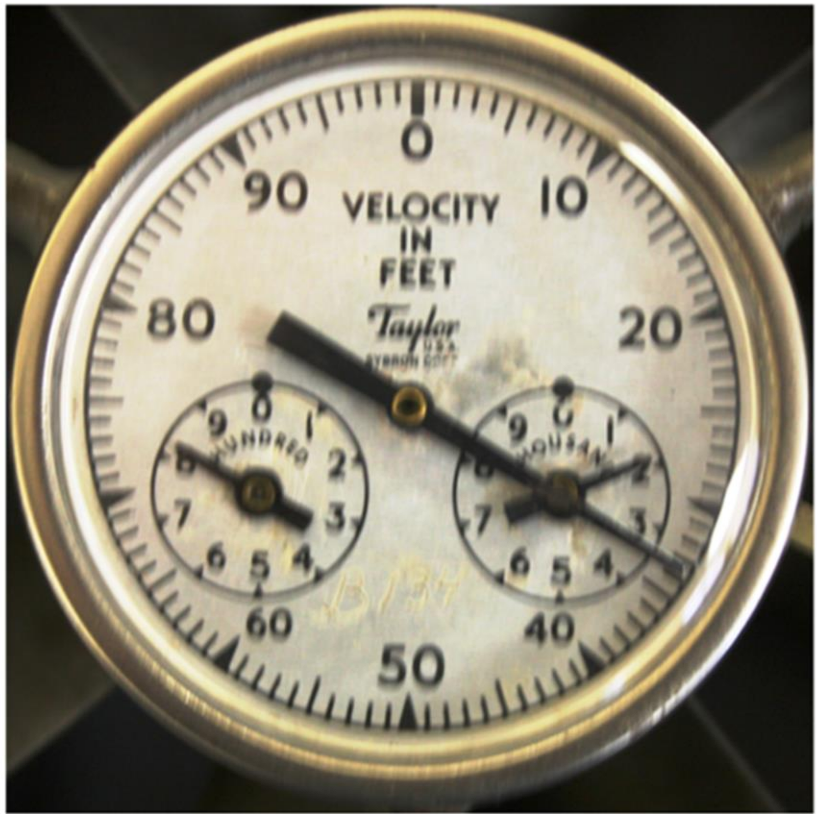
CORRECTED READING = _____ FEET PER MINUTE

WIDTH _____ X HEIGHT _____ = AREA _____ SQUARE FEET

CORRECTED READING _____ X AREA _____ = CUBIC FEET PER MINUTE

ANEMOMETER EXERCISE # 3





ENTRY IS FEET HIGH

ENTRY IS FEET WIDE

ANEMOMETER READING = _FEET PER MINUTE

CORRECTION = FEET PER MINUTE

CORRECTED READING = FEET PER MINUTE

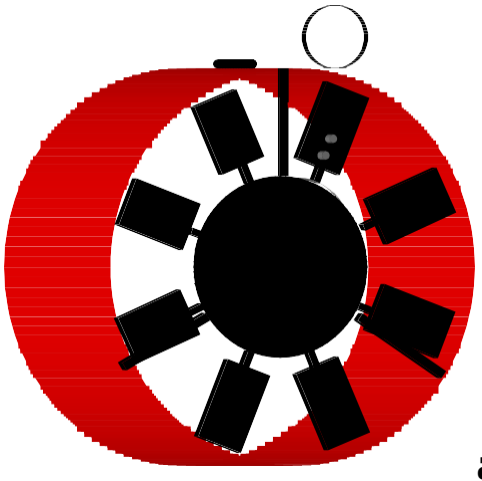
WIDTH____________X HEIGHT_______________= AREA ____________ SQUARE FEET

CORRECTED READING__________________X AREA__________________= CUBIC FEET PER MINUTE

Three categories of Airflow Measurements

- Low Velocity (0 to 120 fpm)
- Medium Velocity (120 to 2000 fpm)
- High Velocity (>2000 fpm)

The principal mechanism for taking medium air velocity measurement is the Anemometer.

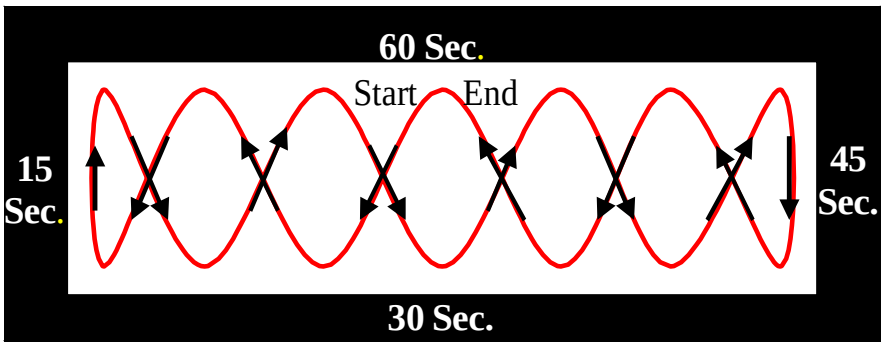


A high speed anemometer is most often used for high velocity air measurements!

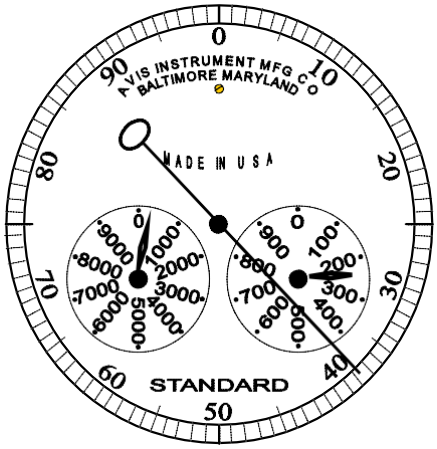
Taking Anemometer Measurements

- Make sure to zero the dial!
- Make sure air flow is into the back of the anemometer.
- Press lever to start dial movement.
- Take reading for 1 Minute.
- Press lever to stop.
- For precise measurements, use a wand or extension rod to minimize effects of hand, arm, and body.

Traverse the whole entry when taking an anemometer reading.



Take care to record correct dial reading.



Dial Reading = 239 feet per minute.

Correct reading per correction chart.

Dial Reading = 239

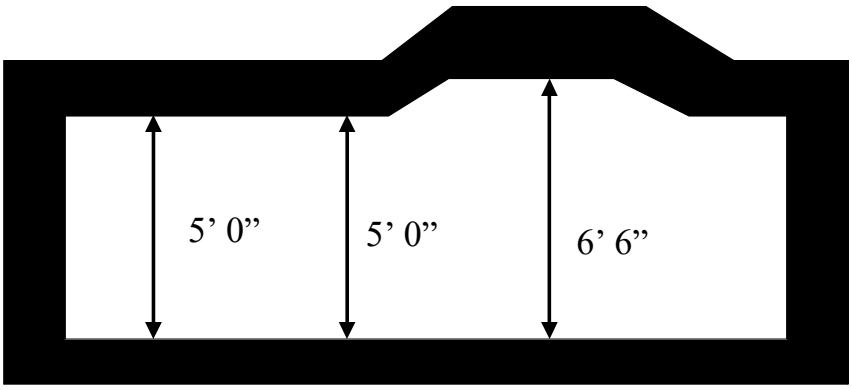
Correction factor = +43

Velocity = 282

Note Calibration Due Date

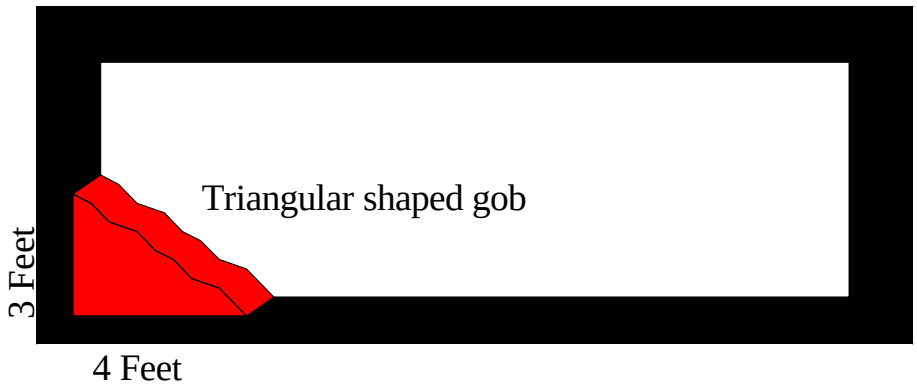
SN # 0000	
Date Due Recal 07/15/99	
VEL	CORR
50	49
100	47
150	45
200	44
250	42
300	40
400	37
500	33
600	34
700	36
800	39
900	41
1000	45

Take multiple height measurements for irregular roof.



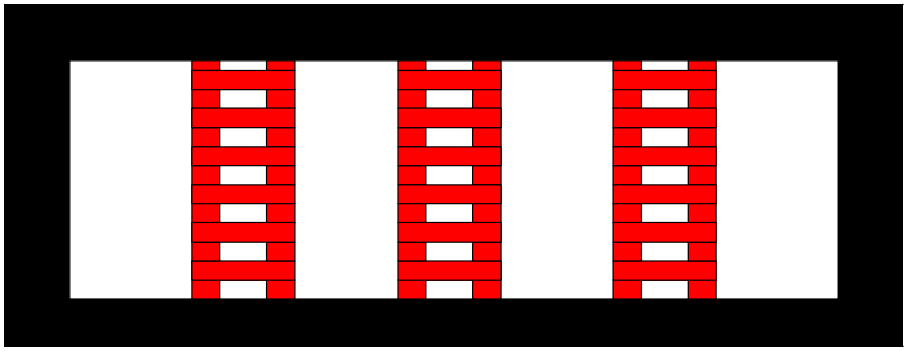
Average Height = 5’ 6”

Estimate Gob Areas.



Gob area = 1/2 X 3 X4 = 6 feet^2

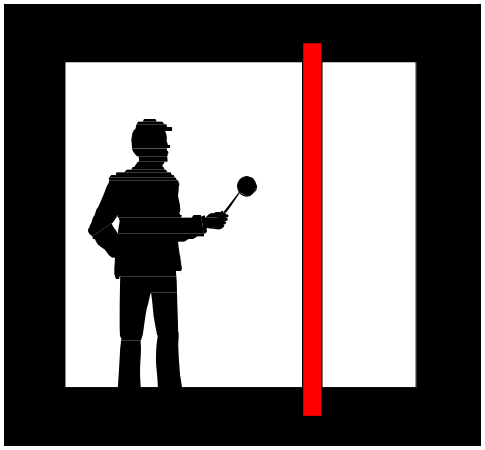
Estimate area of obstruction!



Taking air reading between 3 rows of cribs. You have to estimate the effect of the cribs.

Crib area = 3 X 2.5 X 6 X 50% = 22.5 feet^2

Air velocity has an impact on the amount of obstructions you should consider!



Narrow, <u>high velocity</u> openings may require you to take out the area of your *body*!

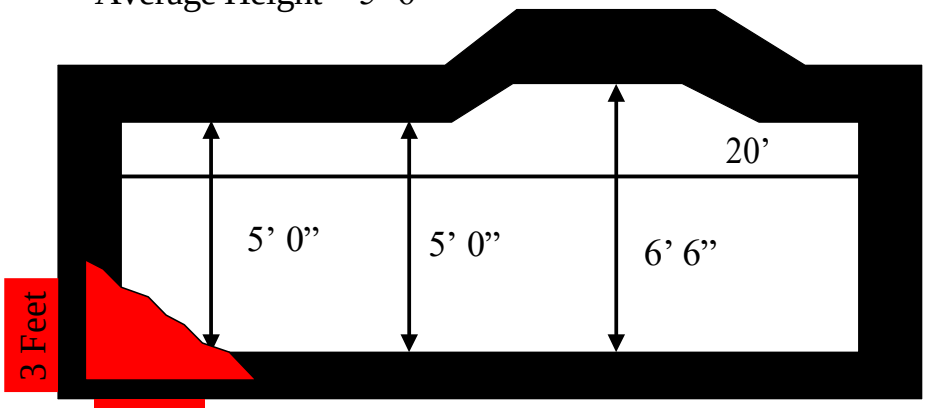
Remove 3 feet^2 for body and 3 feet^2 for timber!

Calculations Example

Gob area = 1/2 X 3 X 4 = 6 feet^2

Q = V A

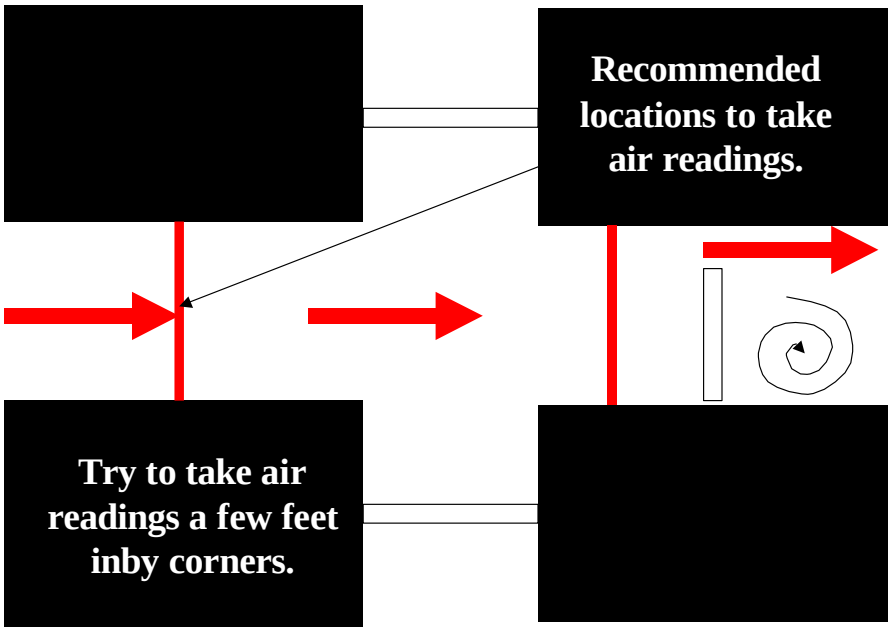
Average Height = 5’ 6”

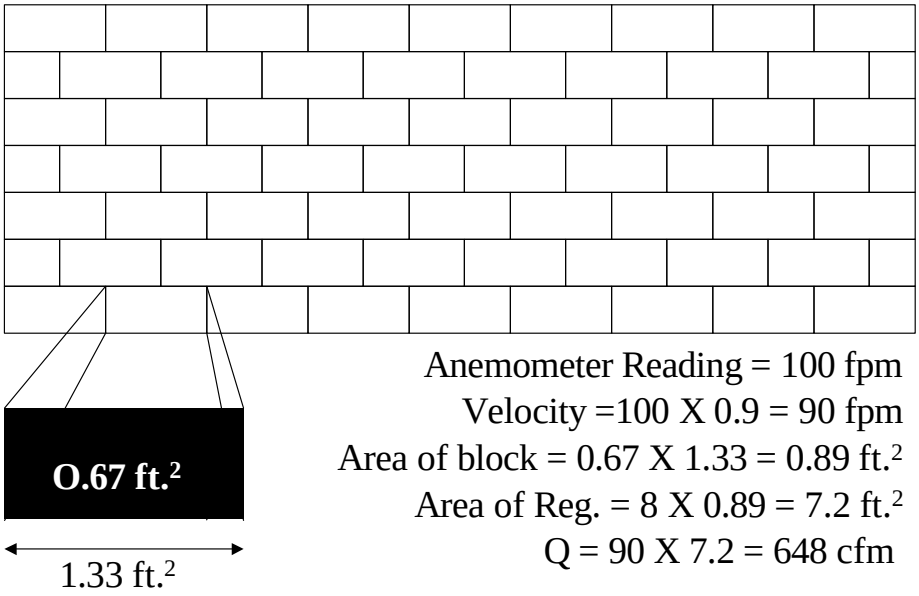


Area = 5.5 X 20 - 6 = 110 ft.^{2} - 6 ft.^{2} = 104 ft.^{2}

Q = V A = 282 X 110 = 31,020 cfm

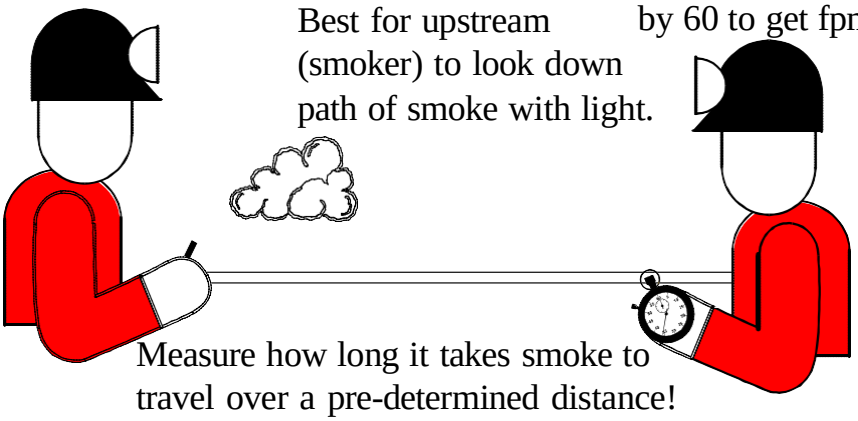
Take Air Readings Upwind of





Anemometer Reading = 100 fpm
Velocity =100 X 0.9 = 90 fpm
Area of block = 0.67 X 1.33 = 0.89 ft.²
Area of Reg. = 8 X 0.89 = 7.2 ft.²
Q = 90 X 7.2 = 648 cfm

Divide distance traveled by time required to get the velocity. Multiply by 60 to get fpm.



Best for upstream (smoker) to look down path of smoke with light.

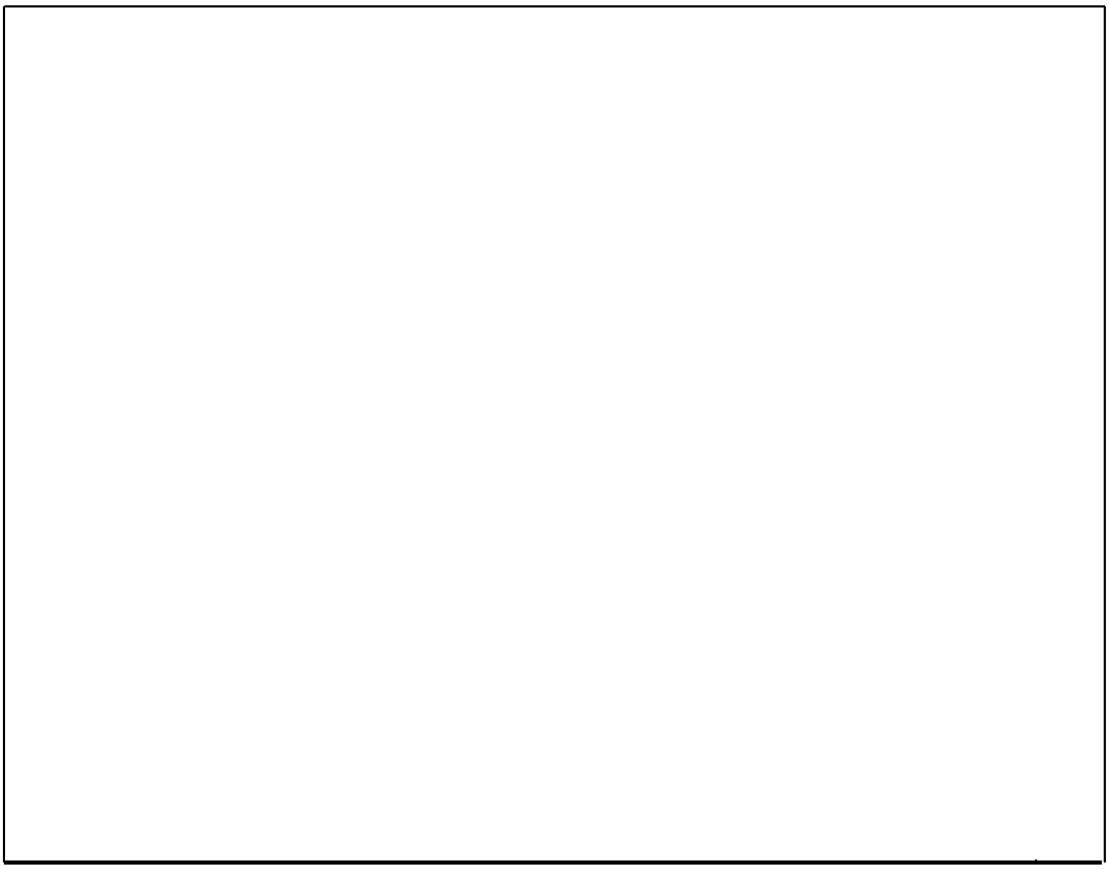
Measure how long it takes smoke to travel over a pre-determined distance!

Example: 6 seconds to travel 10 feet.

10/6 = 1.67, 1.67 X 60 = 100 fpm

How to take smoke readings!

It takes two!



If you cannot take an air reading upwind of regulator then take a centerline reading in the regulator and multiply by 0.9.

Divide the entry into quadrants to take smoke readings.

1	4	7
2	5	8
3	6	9

The number of quadrants is flexible!

OR take centerline reading and multiply by 0.9!

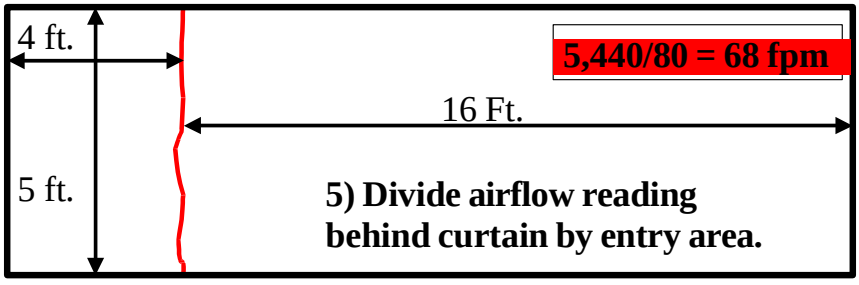
Mean Entry Velocity

4 X 5 = 20 Ft.^{2}

1) Measure area behind curtain.

272 X 20 = 5,440 cfm

3) Calculate airflow behind curtain.



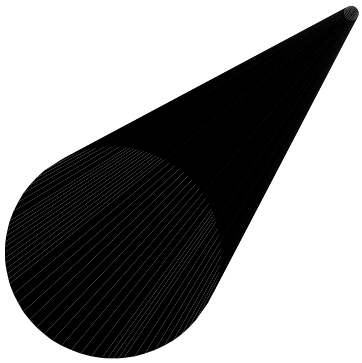
2) Take anemometer reading behind curtain.

Velocity = 272 fpm

4) Measure remaining area of entry.

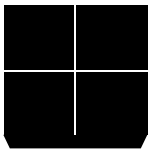
16 X 5 = 80 Ft.^{2}

Ventilation Tubing Area



Area = πR^2

π = 3.14



Vent Tubing Example

Area = 3.14 X 1^2

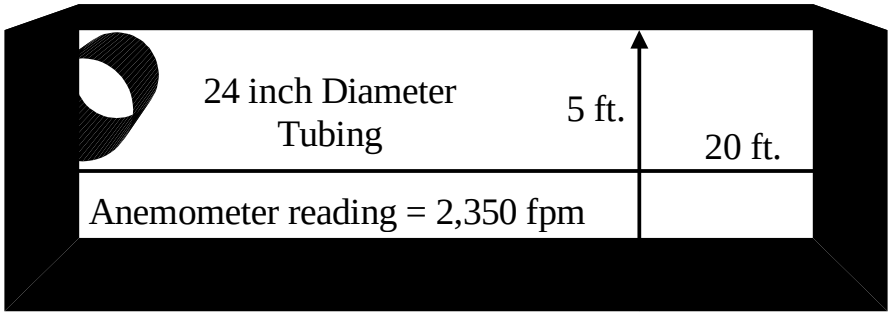
Area = 3.14 $ft.^2$

Area = πR^2

Q=VA

Q=3.14 X 2,350

Q=7,379 cfm

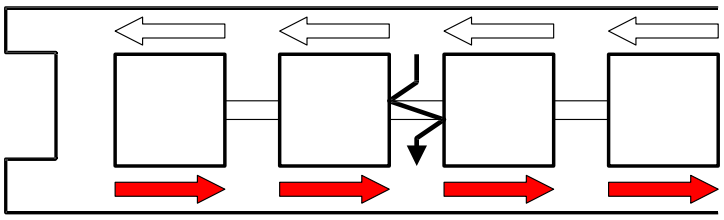


Entry Area = 5 X 20 - 3.14 = 97 $ft.^2$

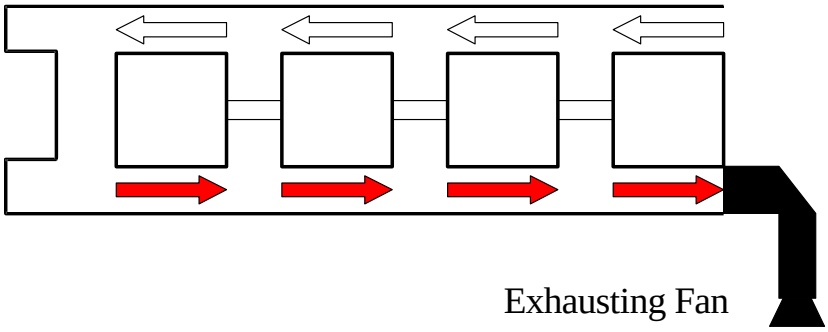
Mean Entry Velocity = 7,379/97 = 76 fpm

Principals of Airflow

Airflow in a mine is induced by pressure differences between intake and exhaust openings.



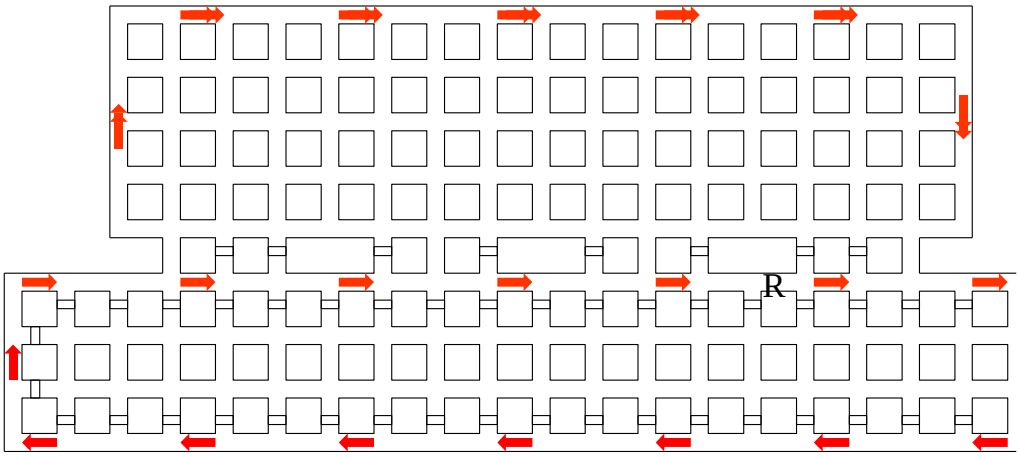
The pressure difference is caused by imposing some form of pressure at one point or a series of points in the ventilating system.



The pressure created must be great enough to overcome frictional resistance and shock losses.

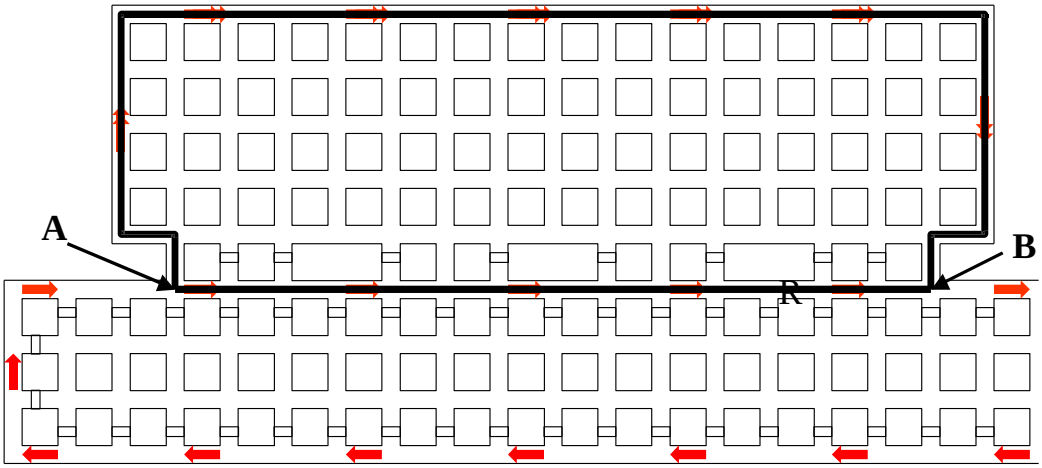
- Friction pressure losses are caused by the resistance of the walls on the air stream. Friction losses therefore depend upon the conditions and roughness of individual wall surfaces and velocity of air.
- Shock pressure losses are caused by abrupt changes on the velocity of air movement. Shock losses therefore are the result of changes in air direction or of airway areas, obstructions, and regulation.

Passageways, both intake and returns must be provided to conduct airflow



Airflow follows a square-law relationship between volumes and pressures, that is, twice the volume requires four times the pressure.

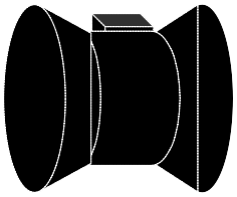
The pressure drop for each split leaving from a common point and returning to a common point will be the same regardless of the air quantity flowing in each split.



Mine ventilation pressures, with respect to atmospheric pressures, may be either positive (blowing) or negative (exhausting).

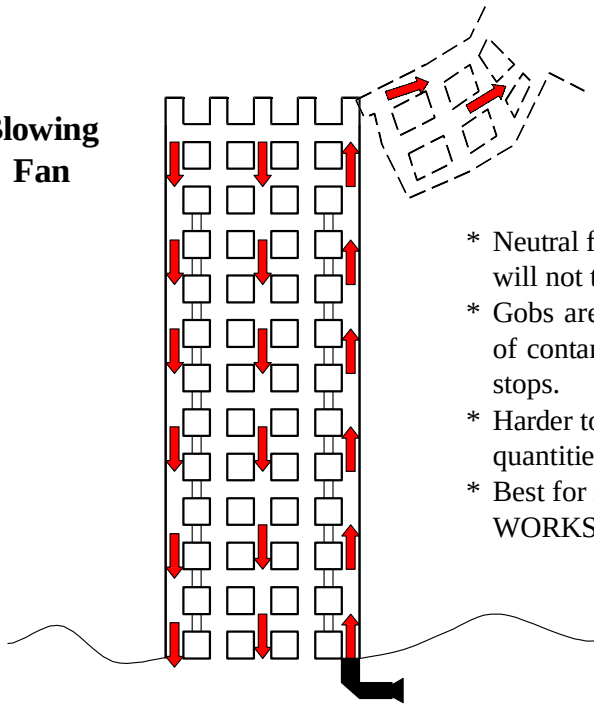
- Total Pressure = Static Pressure + Velocity Pressure
- Static Pressure is the pressure exerted in all directions. Tire pressure is static pressure. Can be negative or positive.
- Velocity pressure is directional pressure. You feel velocity pressure when you feel the wind. VP is always positive.
- Exhausting fans are generally rated on Static Pressure.
- Blowing fans are generally rated on Total Pressure.

Air always flows from a point of higher to lower pressure.



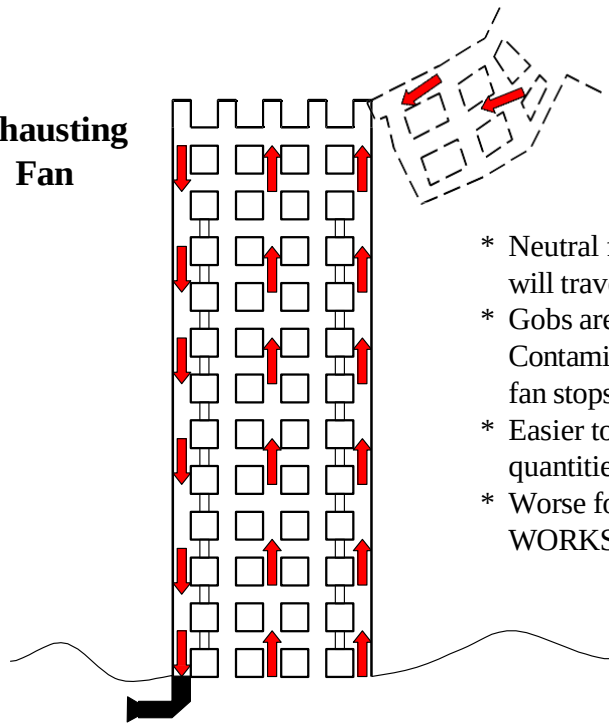
* Blowing fans create a high pressure point immediately inby the fan. Air travels from this high point through the mine to the surface.
* Exhausting fans create a low pressure point immediately inby the fan. Air travels from the surface through the mine to this low pressure point.

Blowing Fan



* Neutral flows to outside. Smoke will not travel to face area.
* Gobs are "pressurized". Less influx of contaminants from gobs until fan stops.
* Harder to maintain required LOC quantities.
* Best for mining near OLD WORKS.

Exhausting Fan

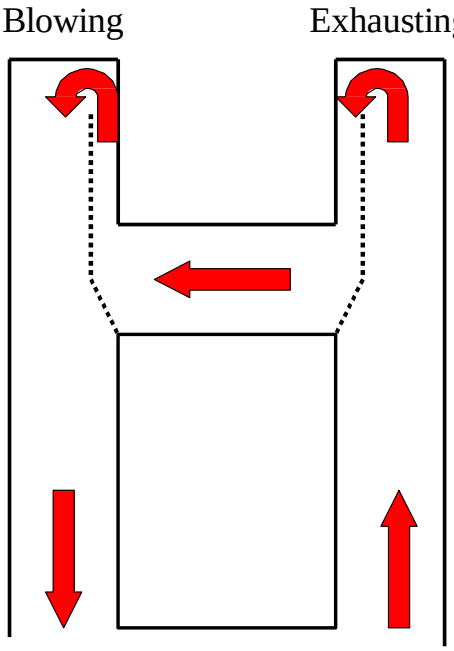


* Neutral flows toward face. Smoke will travel toward face area.
* Gobs are "under suction". Contaminants flow from gobs until fan stops.
* Easier to maintain required LOC quantities.
* Worse for mining near OLD WORKS.

Face Ventilation

Blowing

- Higher velocity at face.
- Best for gas.
- Worse for dust.

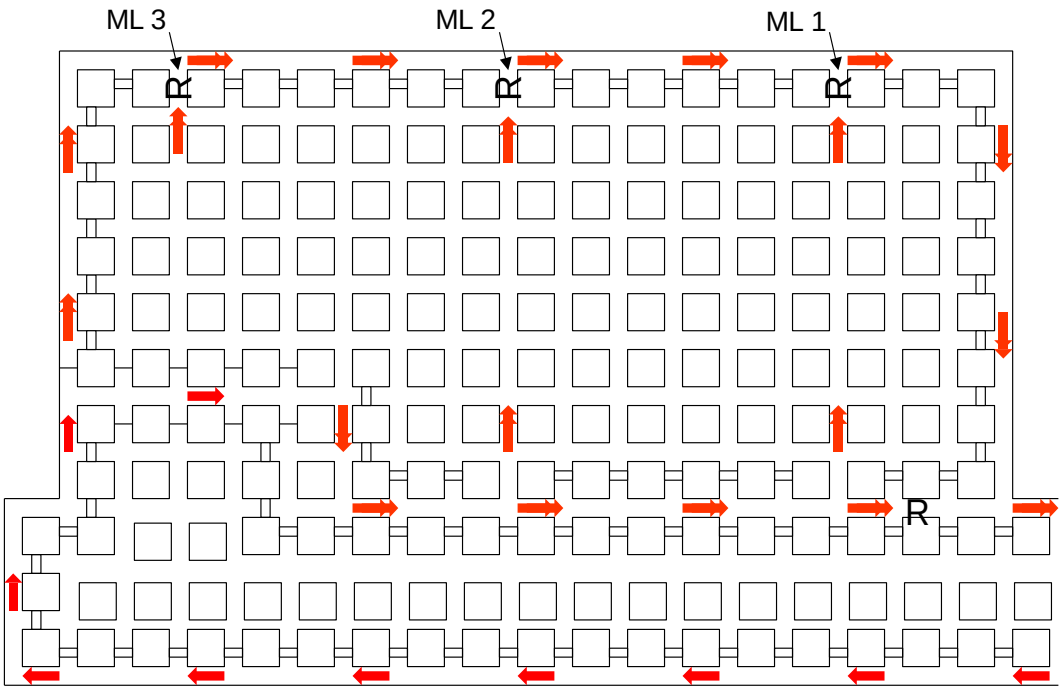


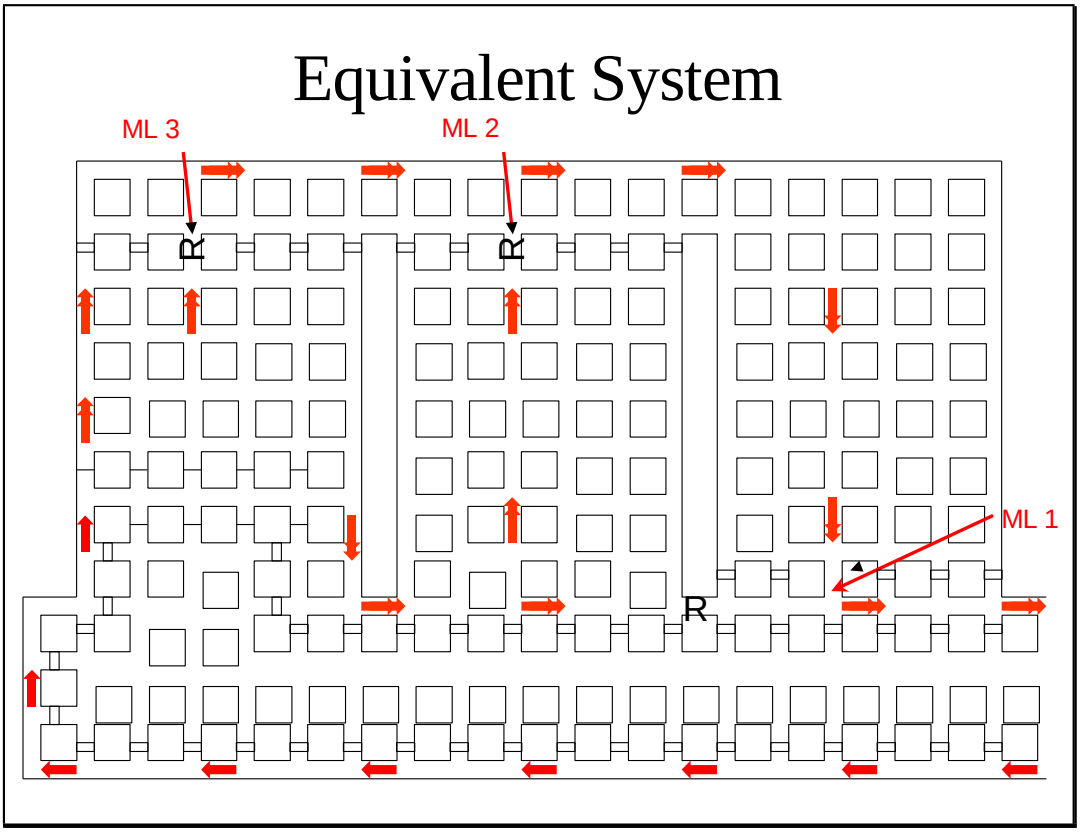
Exhausting

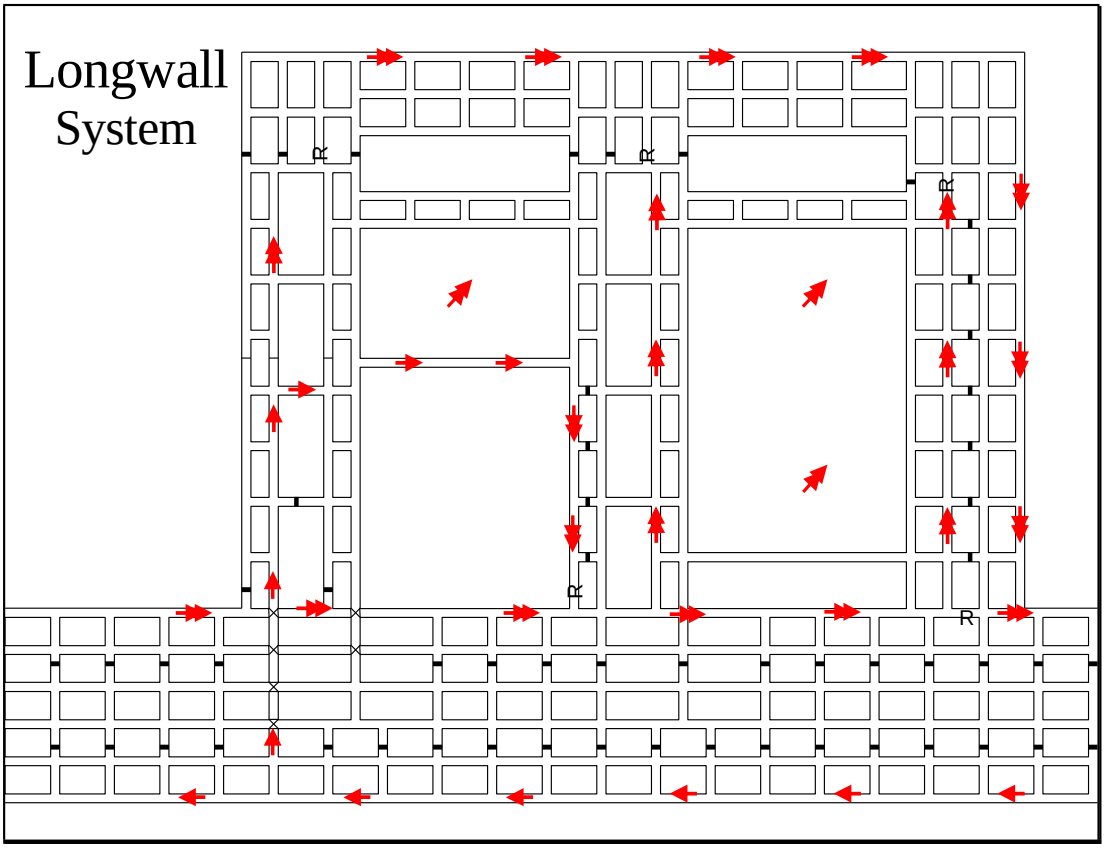
- Lower velocity at face.
- Worse for Gas.
- Good for Dust.

Bleeder Systems

Wrap Around System




Equivalent System
ML 3
ML 2
ML 1
R
R
R


Longwall System
R
R
R
R
R

WHERE TO TAKE AIR READINGS!

§45.2-826. Pre-shift Examinations.

C. During the Pre-shift examination, the mine foreman shall determine the volume of air entering each of the following areas if a miner is scheduled to work in the areas during the oncoming shift:

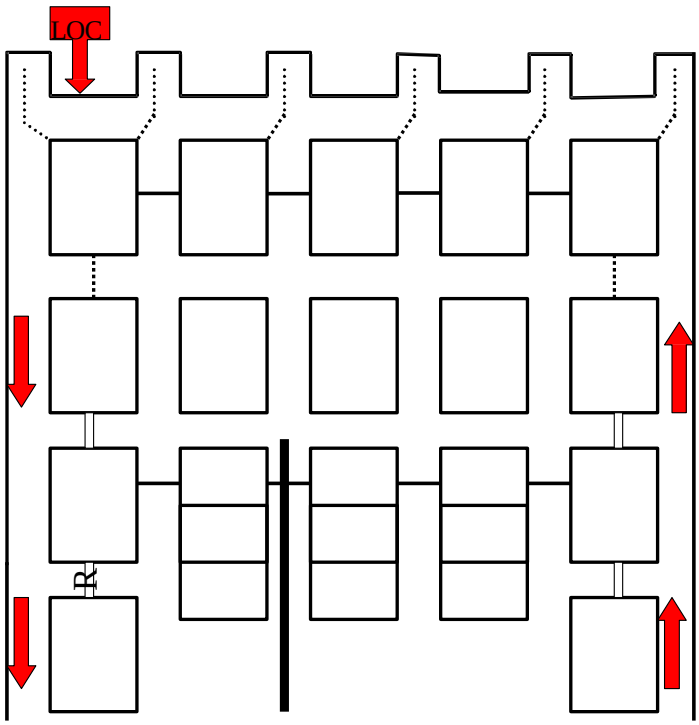
1 In the ***last open crosscut***, which means the ~~crosscut in the line of pillars containing the permanent stoppings that separate the intake and return air courses~~, of each set of entries or rooms on each working section and areas where mechanized mining equipment is being installed or removed.

§45.2-827. On-shift Examinations.

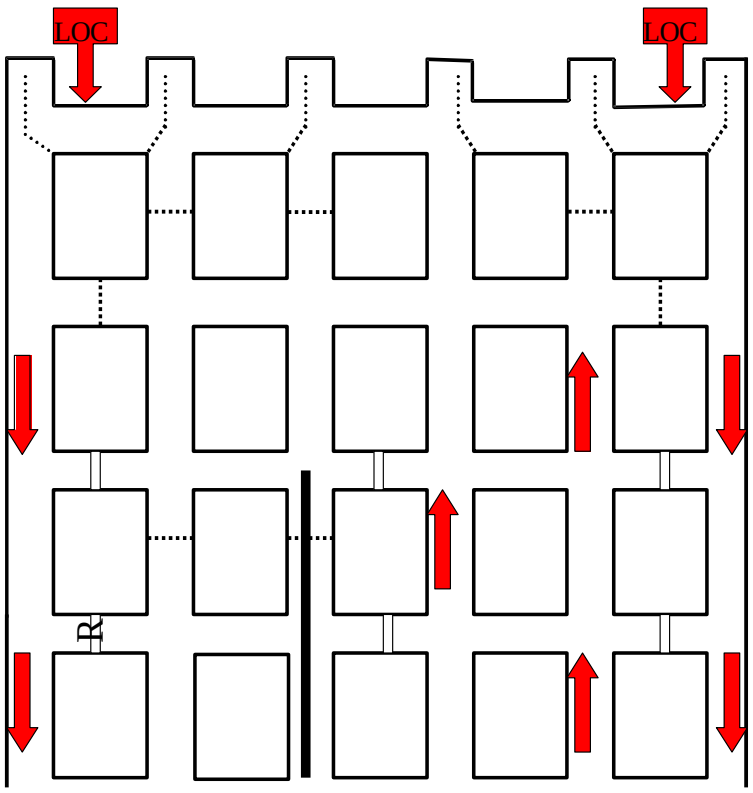
C. Persons conducting the on-shift examination shall determine at the following locations which are underground:

1 The volume of air in the ***last open crosscut***, which means the crosscut in the line of pillars containing the permanent stoppings that separate the intake and return air ~~courses, of each set of entries or rooms on each working section and areas where mechanized mining equipment is~~ being installed or removed.

Where is Last Open Crosscut?



Where is Last Open Crosscut?

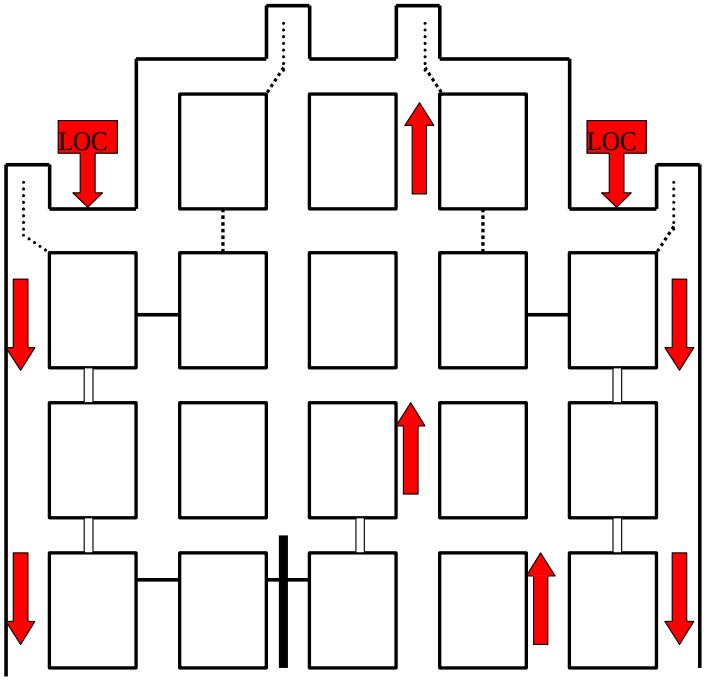


§45.2-828. Volume of Air.

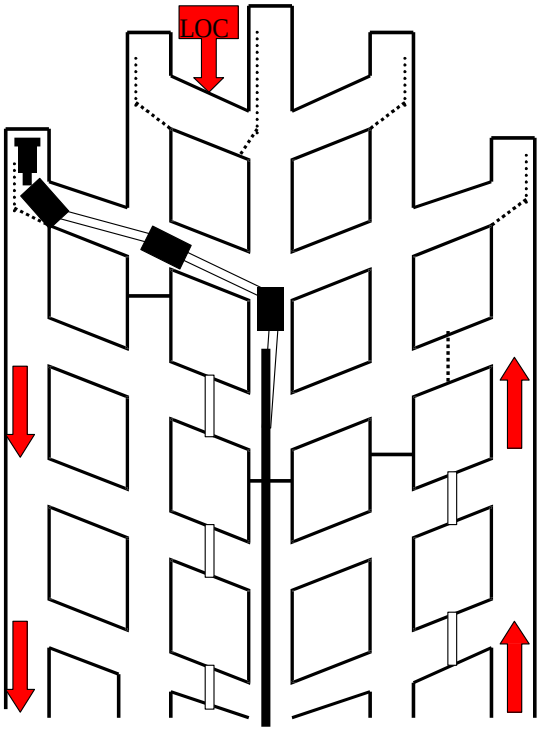
A The quantity of air passing through the last open crosscut shall be ~~not less than 9,000~~ cubic feet per minute; provided, however, that the quantity of air reaching the last open crosscut in pillar recovery sections may be less than 9,000 cubic feet per minute, if at least 9,000 cubic feet of air per minute is being delivered to the ~~intake end of the pillar line~~.

B The air current at working faces shall under all conditions have a ~~sufficient volume~~ to readily dilute and carry away smoke from blasting and any flammable or harmful gasses.

Where is Last Open Crosscut?



Where is Last Open Crosscut?



§45.2-826. Pre-shift Examinations.

C. During the Pre-shift examination, the mine foreman shall determine the volume of air entering each of the following areas if a miner is scheduled to work in the areas during the oncoming shift:

3 The volume of air at the intake end of any pillar line:

1 where a single split of air is used, in the intake entry furthest from the return air course, immediately outby the first open crosscut outby the line of pillars being mined, or

2 if a split system is used, in the intake entries of each split immediately inby the split point.

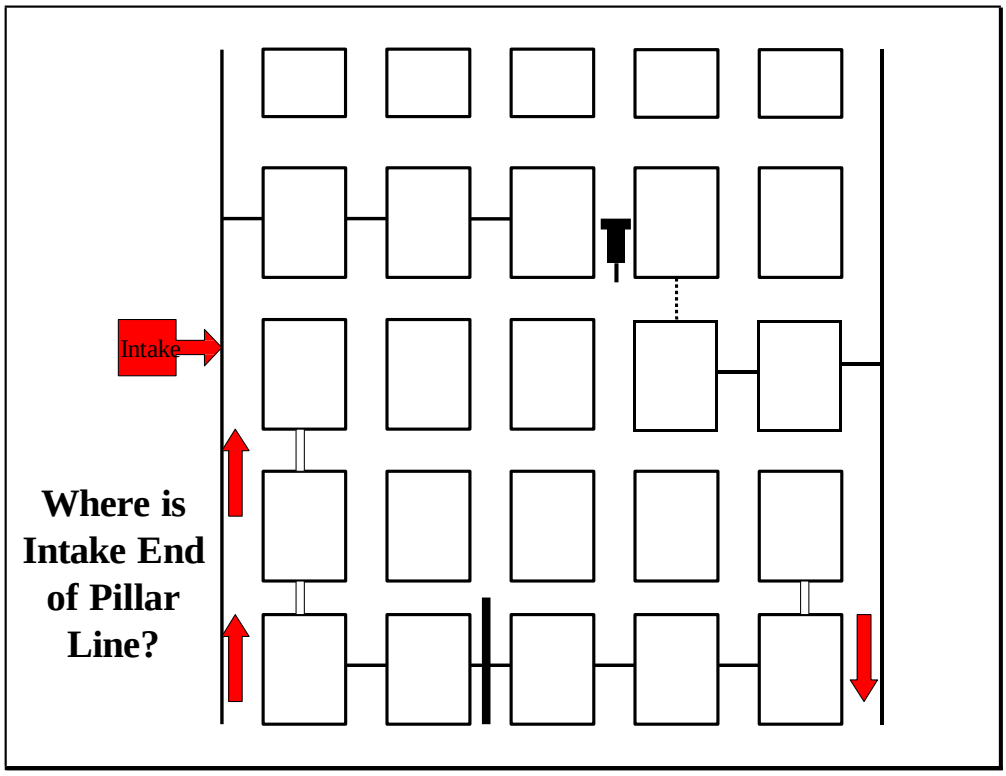
§45.2-827. On-shift Examinations.

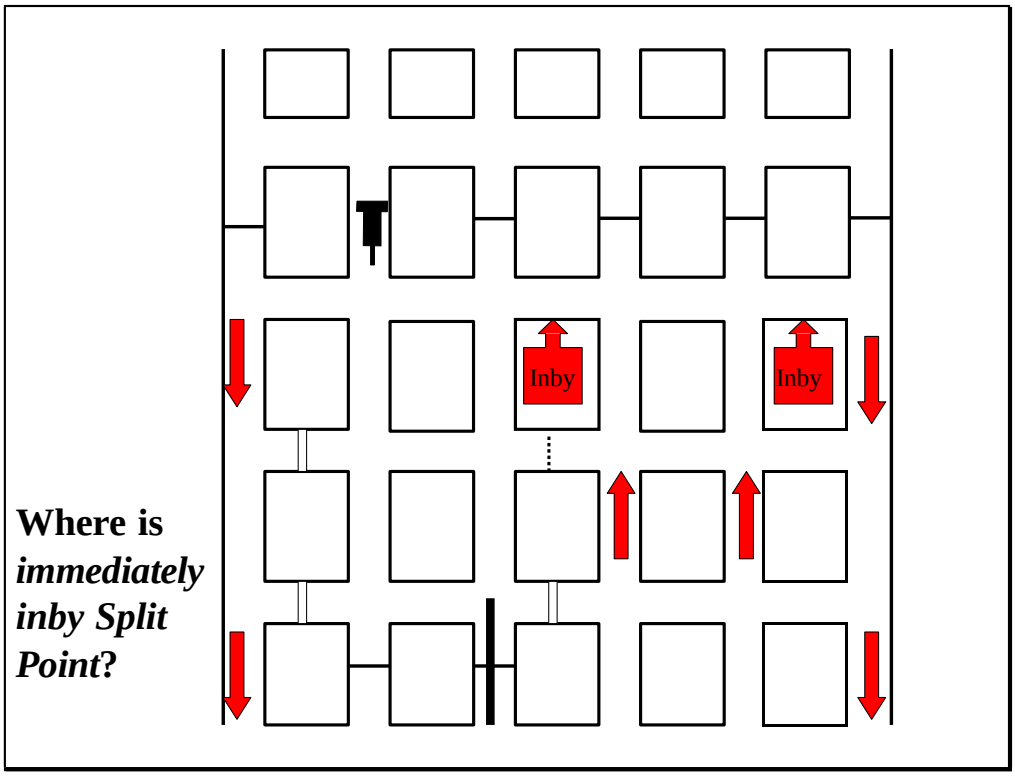
C. Persons conducting the on-shift examination shall determine at the following locations which are underground:

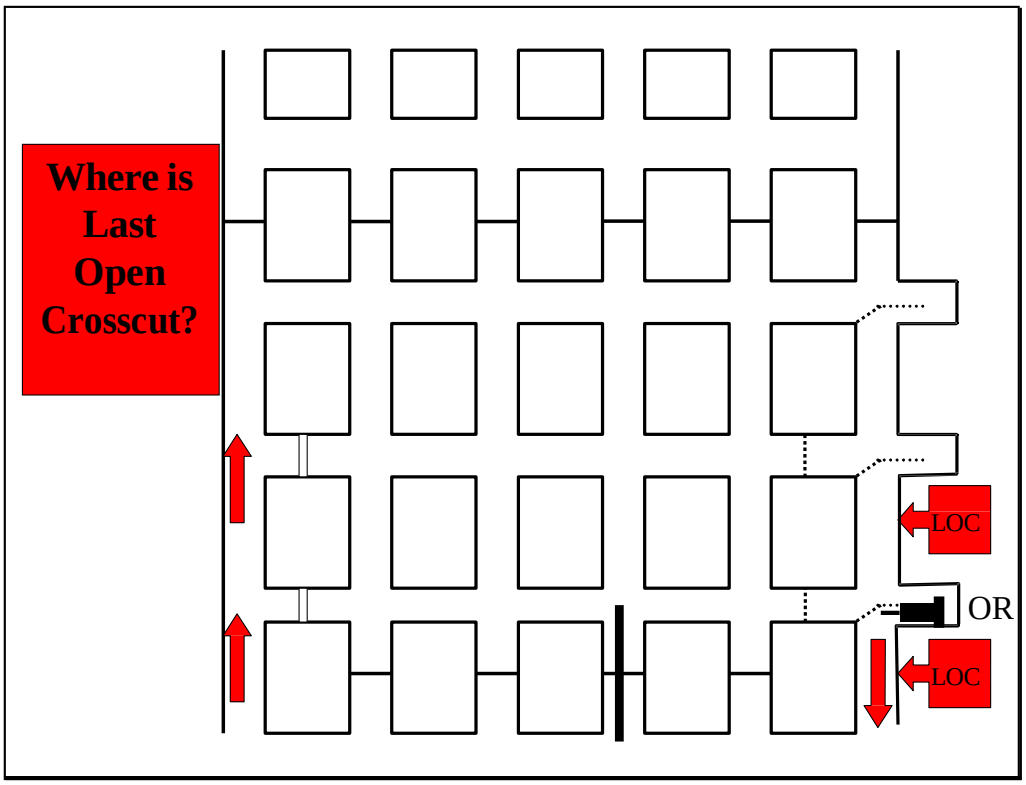
4 The volume of air at the intake end of any pillar line:

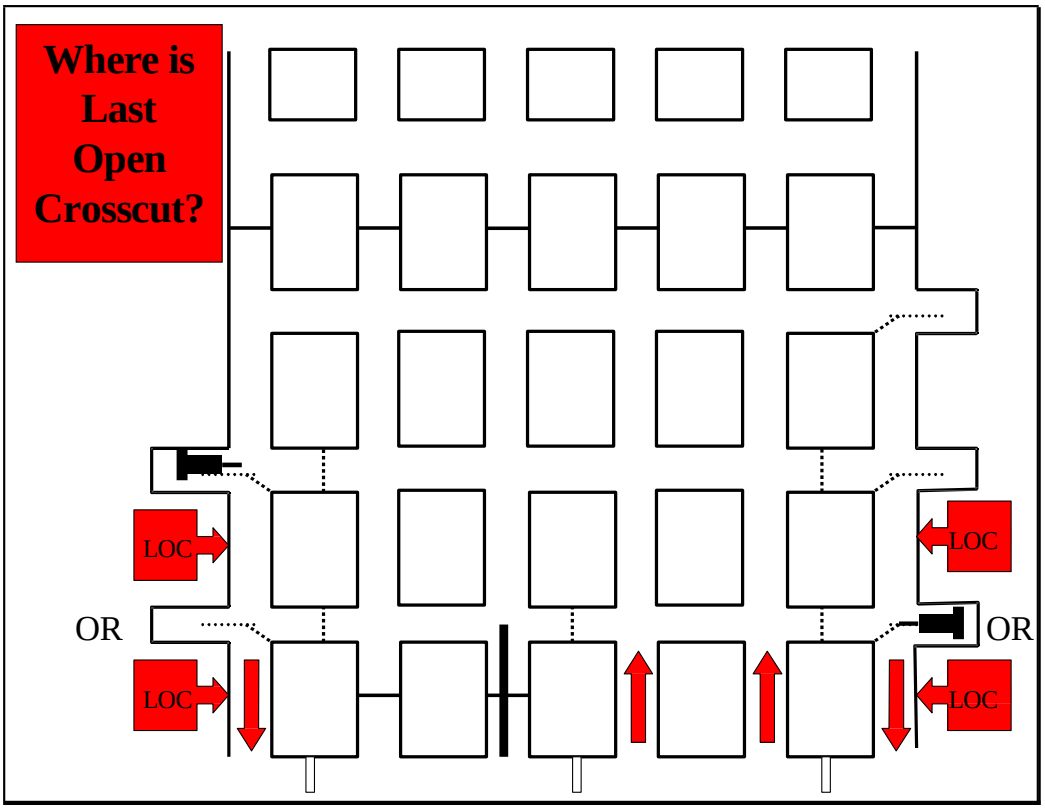
1 where a single split of air is used, in the ~~intake entry~~ furthest from the return air course, ~~immediately outby the first open crosscut outby the line of pillars being mined~~, or

2 if a split system is used, in the intake entries of each split ~~immediately inby the split point~~.


Intake
Where is Intake End of Pillar Line?


Inby
Inby
Where is *immediately inby Split Point*?


Where is Last Open Crosscut?
LOC
OR
LOC


Where is Last Open Crosscut?
LOC
LOC
OR
OR
LOC
LOC

§45.2-826. Pre-shift Examinations.

C. During the Pre-shift examination, the mine foreman shall determine the volume of air entering each of the following areas if a miner is scheduled to work in the areas during the oncoming shift:

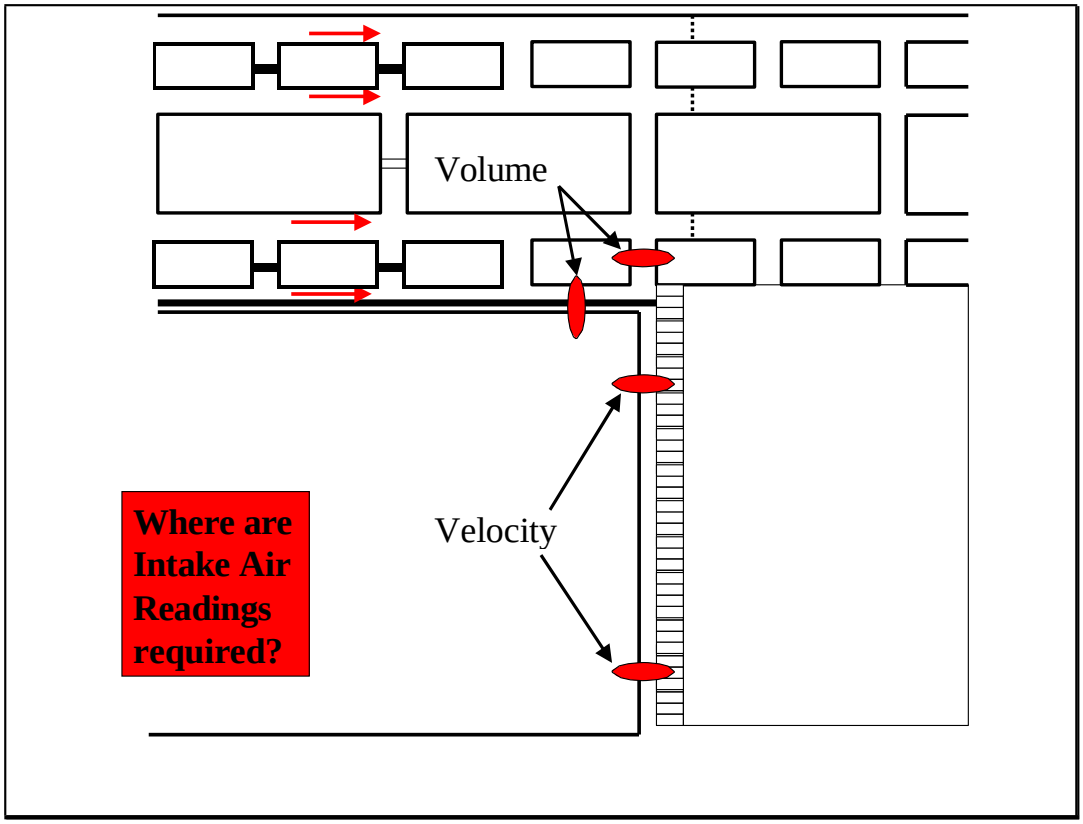
2 On each Longwall or Shortwall in the intake entry or entries at the intake end of the Longwall or Shortwall face immediately outby the face and the velocity of air at each end of the face at the locations specified in the approved ventilation plan required by the federal mine safety law.

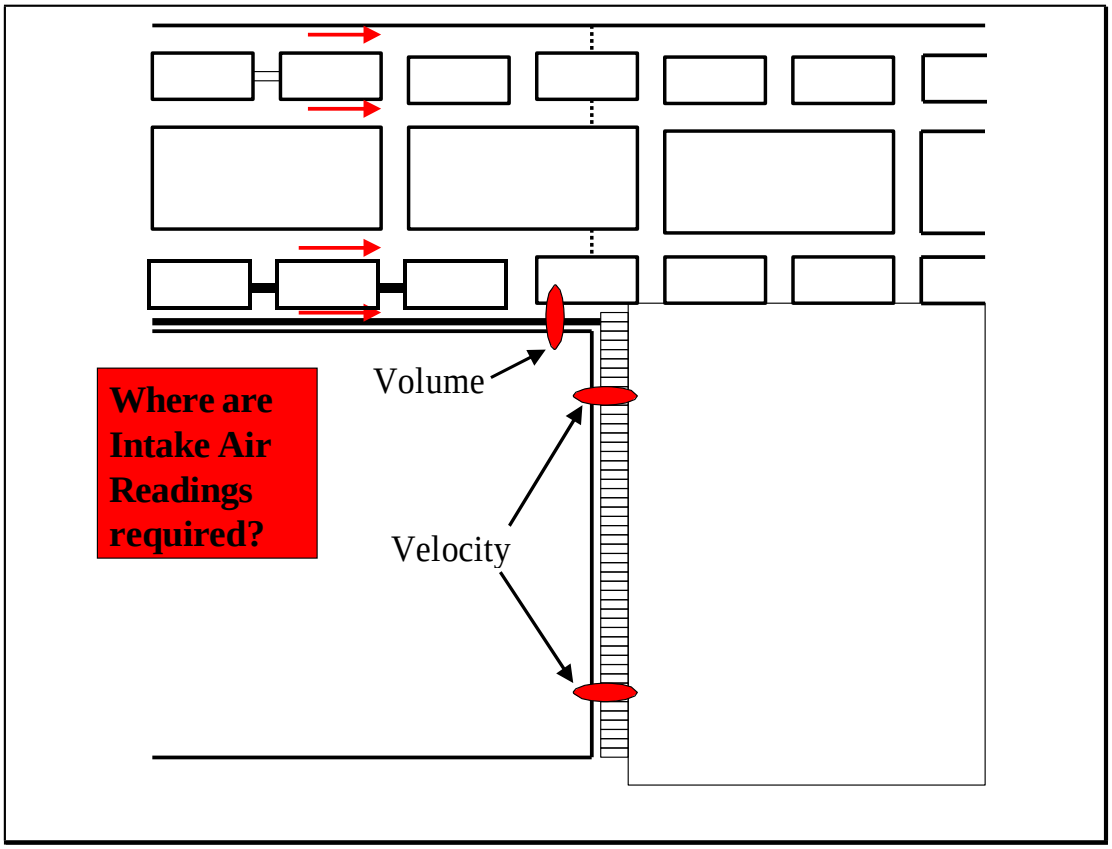
§45.2-827. On-shift Examinations.

C. Persons conducting the on-shift examination shall determine at the following locations which are underground:

2 The volume of air on a Longwall or Shortwall, including areas where Longwall or Shortwall equipment is being installed or removed, in the intake entry or entries at the intake end of the Longwall or Shortwall.

3 The velocity of air at each end of the Longwall or Shortwall face at the locations specified in the approved ventilation plan required pursuant to the federal mine safety law;

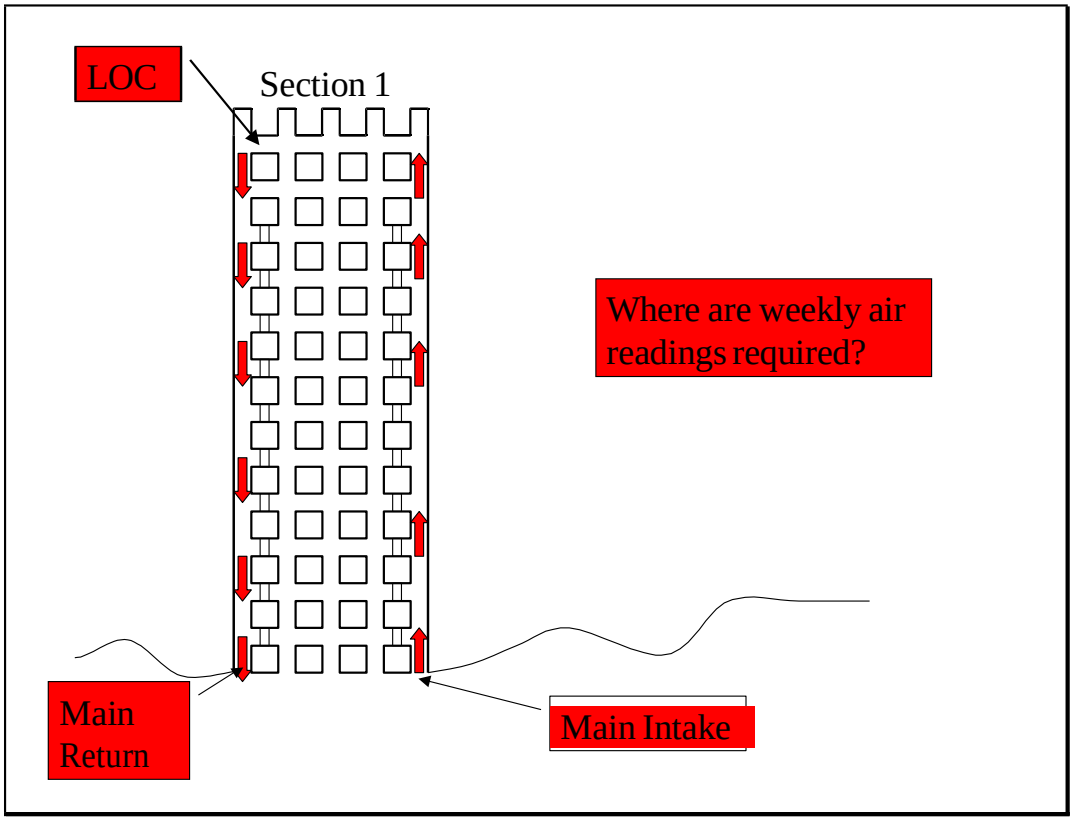

Volume
Where are Intake Air Readings required?
Velocity

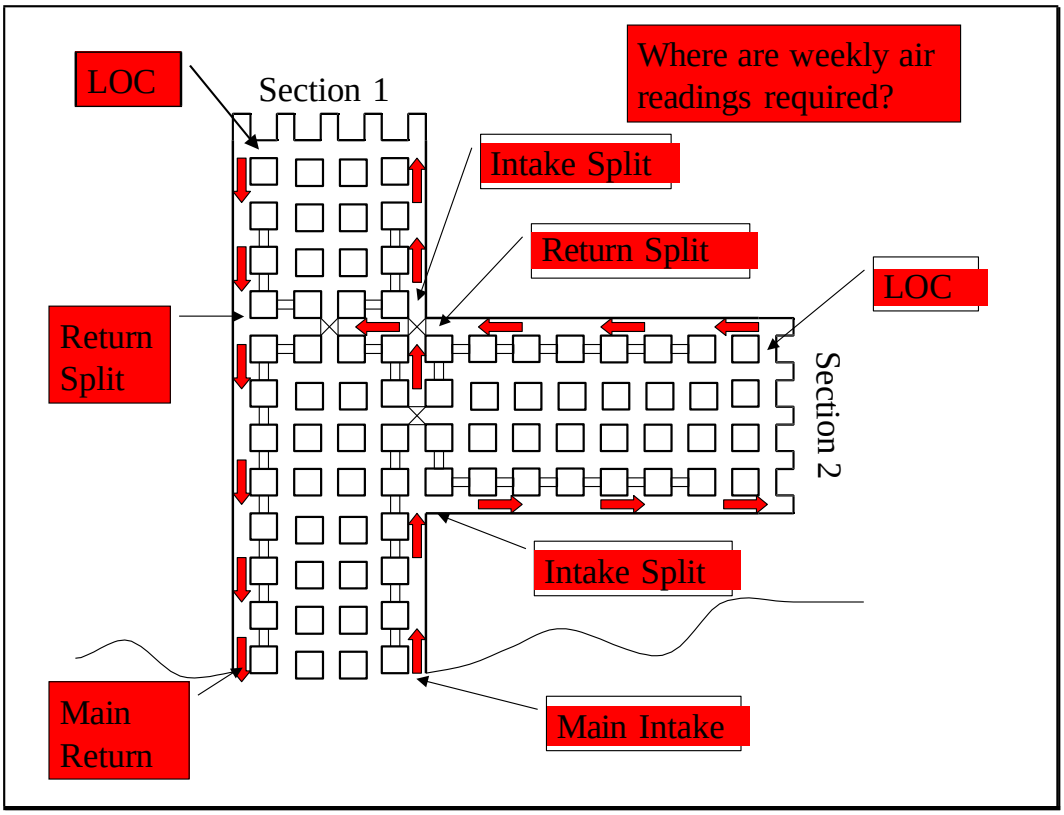

Where are Intake Air Readings required?
Volume
Velocity

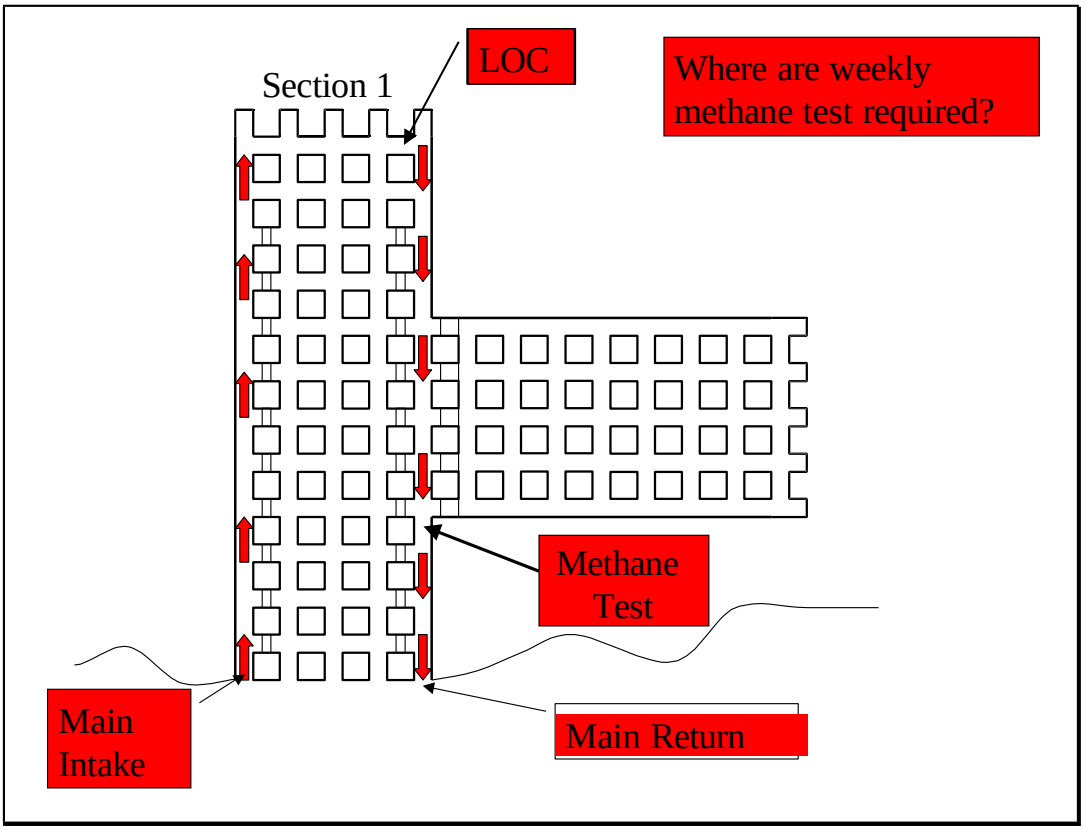
§45.2-828. Weekly Examinations.

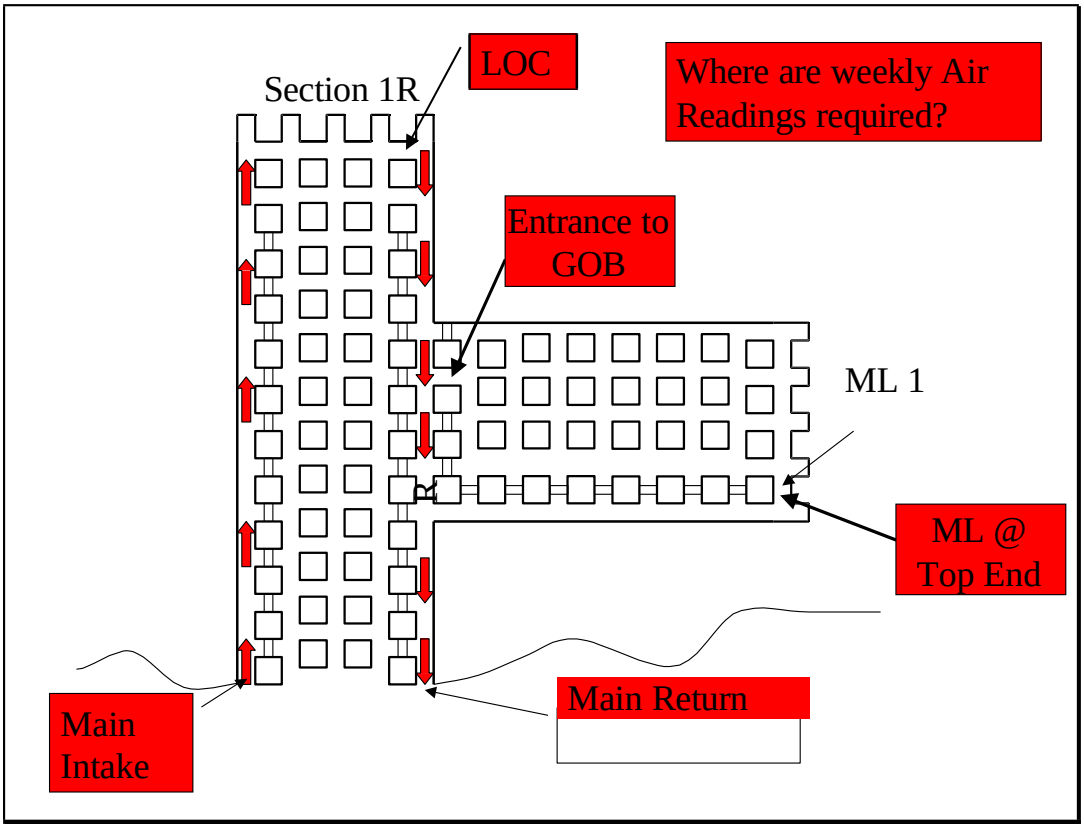
D. At least every seven days , a certified person shall:

- Determine the volume of air entering the main intakes and in each intake split;
- Determine the volume of air and test for methane in the last open crosscut in any pair or set of developing entries or rooms, in the return of each split of air immediately before it enters the main returns and where the air leaves the main returns; and
- Test for methane in the return nearest each set of seals immediately after the air passes the seals.




LOC
Section 1
Where are weekly air readings required?
Intake Split
Return Split
LOC
Return Split
Section 2
Intake Split
Main Return
Main Intake


LOC
Section 1
Where are weekly methane test required?
Methane Test
Main Intake
Main Return



Actions for Excessive Methane

§45.2-839. Actions for excessive methane. Paragraph A

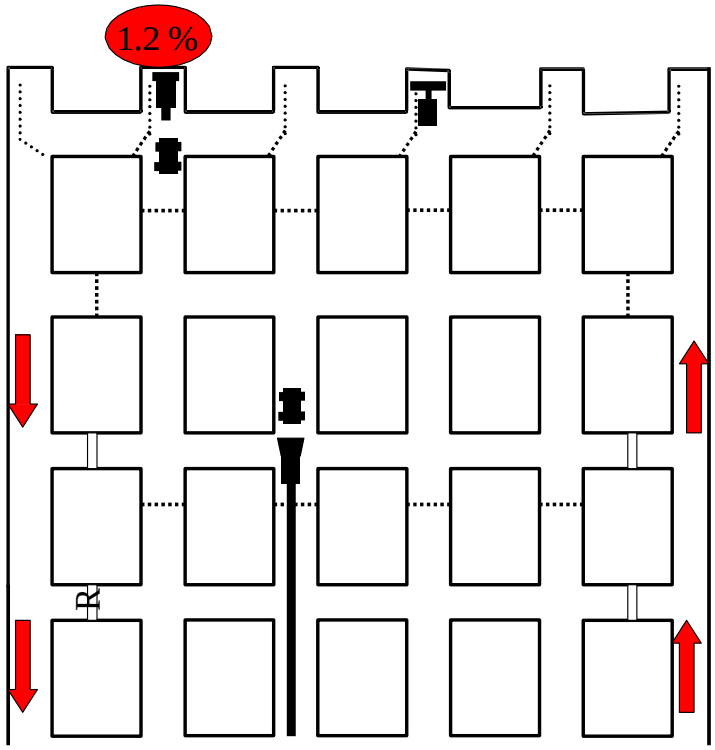
A Tests for methane concentration under this section shall be made by certified or qualified persons trained in the use of an approved detecting device which is properly calibrated. Tests shall be made at least twelve inches from the roof, face, ribs, and floor.

§45.2-839. Actions for excessive methane. Paragraph B

B When ~~one percent or more~~ methane is present in a ~~working place~~ or an intake air course, including an air course in which a belt conveyor is located, or in an area where mining equipment is being installed or removed, ~~work shall cease~~ and electrical power shall be de-energized in the affected working place at the equipment except for intrinsically safe atmospheric monitoring systems (AMS).

1. Stop Work in No. 2

2. Kill power at Miner.



Methane Example

§45.2-839. Actions for excessive methane. Paragraph B Continued

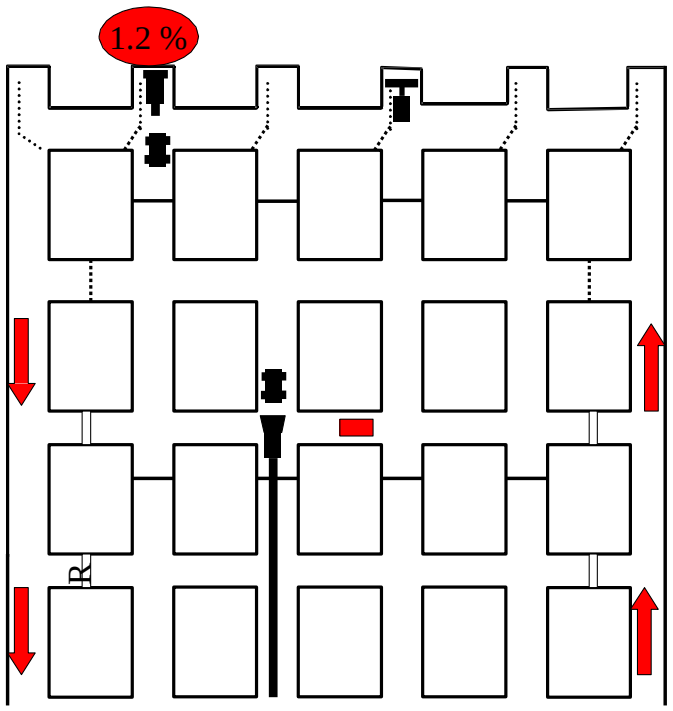
- Changes or adjustments shall be made to the ventilation system to reduce the concentration to below one percent. *Only work to reduce the concentration of methane below one percent shall be permitted.* This does not apply to other faces in the entry or slope in which work can safely continue.

1. Stop Work in No. 2

2. Kill power at Miner.

3. Adjust Ventilation.

Methane Example



§45.2-839. Actions for excessive Methane. Paragraph C

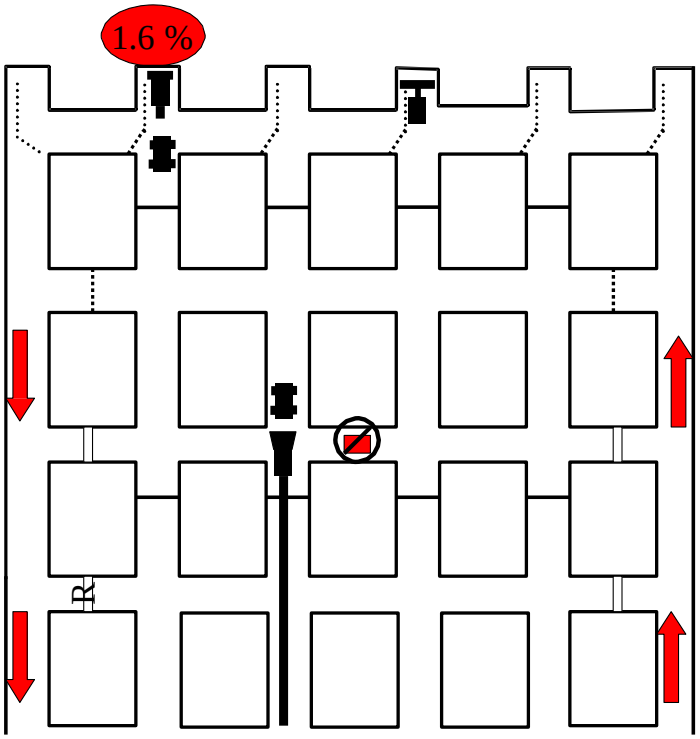
C When ~~one and one-half~~ percent or more methane is present in a working place or an intake air course, including an air course in which a belt conveyor is located, or an area where mining equipment is being installed or removed, ~~only work necessary to reduce the methane concentration~~ to less than one and one-half percent will be permitted and all other personnel shall be ~~withdrawn~~ from the affected area. Electrically powered equipment in the affected area shall be de-energized and other mechanized equipment shall be shut off except for intrinsically safe atmospheric monitoring systems (AMS).

1. Work to reduce CH_4 concentration.

2. Withdraw all other personnel.

3. De-energize power.

Methane Example

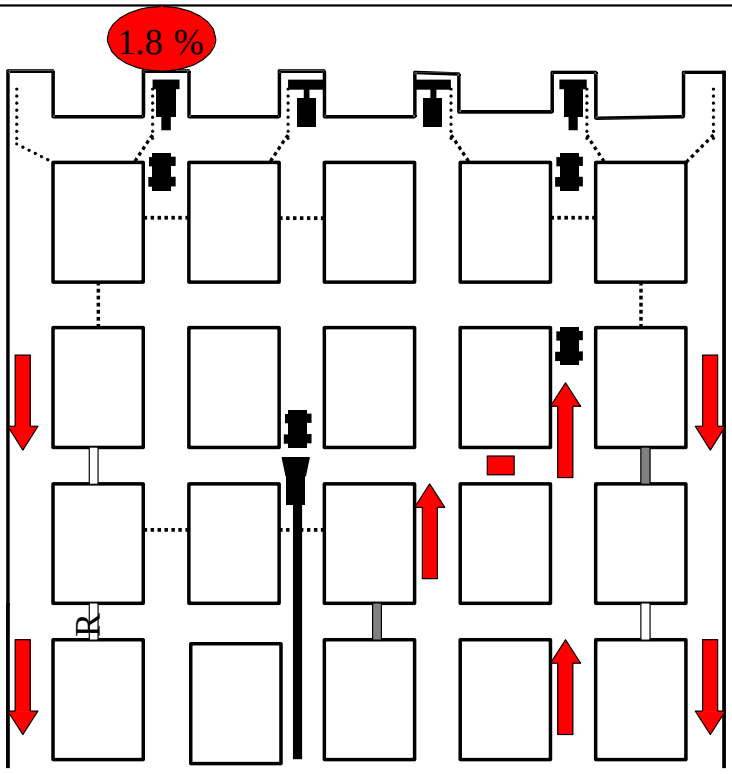


1. Work to reduce CH_4 concentration.

2. Withdraw all other personnel.

3. De-energize power.

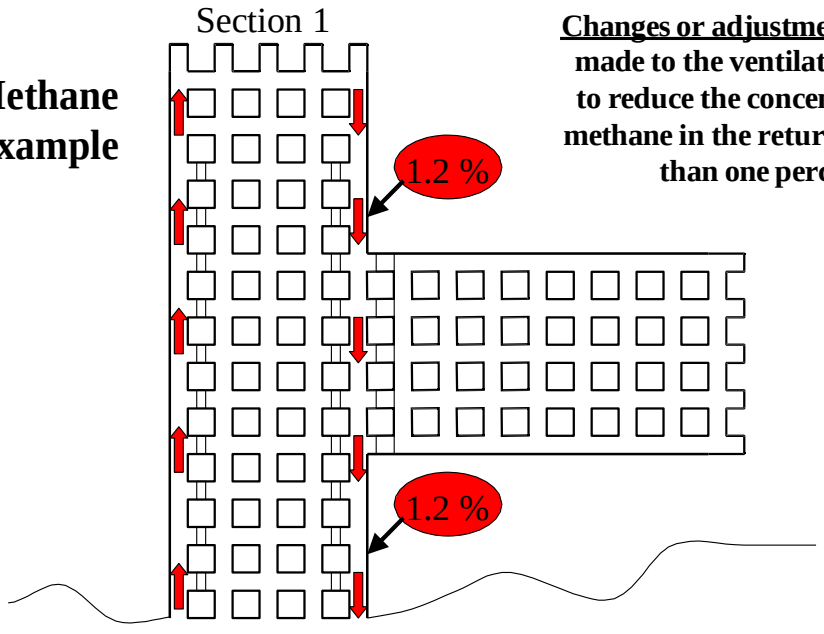
Methane Example



§45.2-839. Actions for excessive methane. Paragraph D

D When one percent or more methane is present in a return or split between the last working place on a working section and where that split of air meets another split of air, or the location at which the split is used to ventilate seals or worked out areas, changes or adjustments shall be made to the ventilation system to reduce the concentration of methane in the return air to less than one percent.

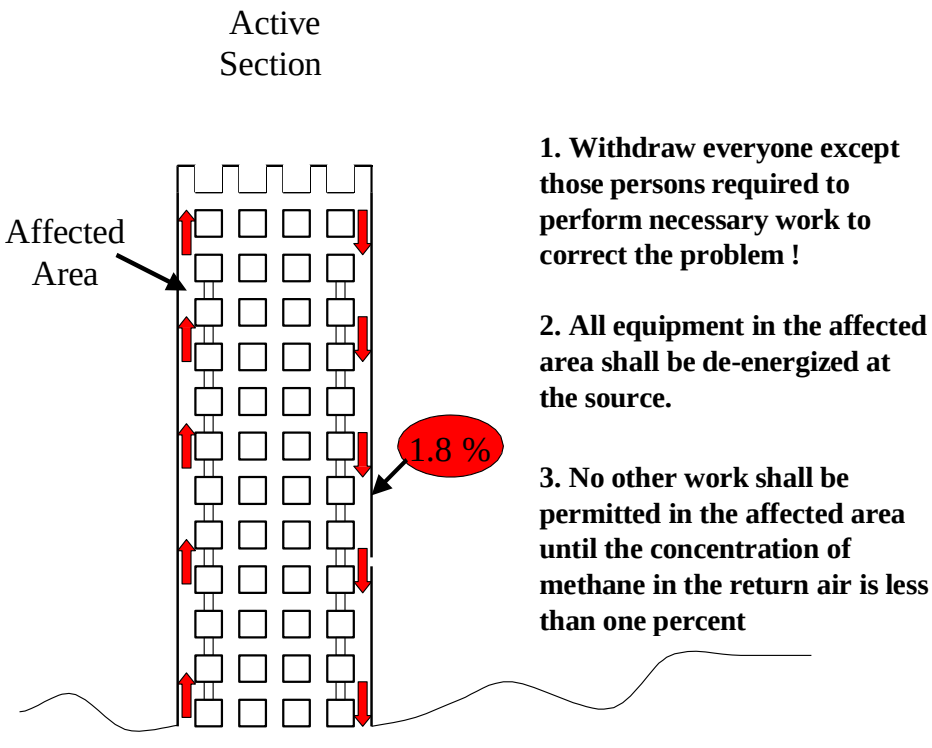
Methane Example

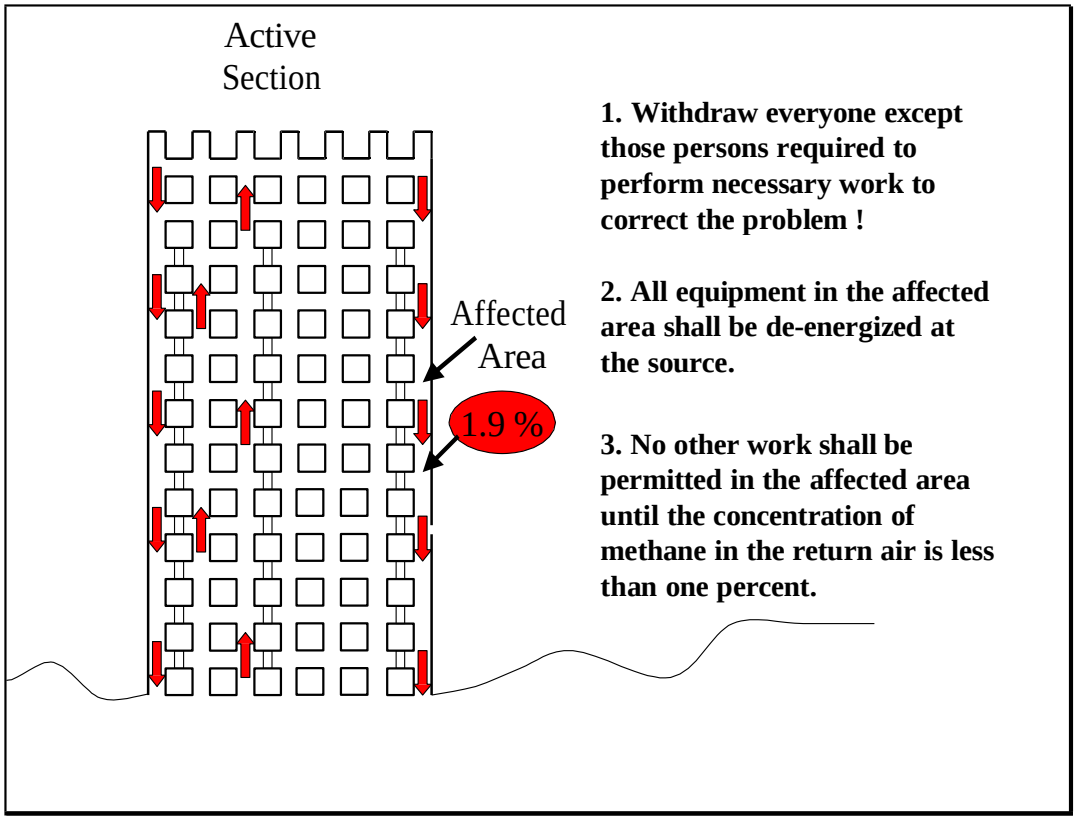


Changes or adjustments shall be made to the ventilation system to reduce the concentration of methane in the return air to less than one percent

§45.2-839. Actions for excessive methane. Paragraph D

- When one and one-half percent or more methane is present in a return air split between the last working place on a working section and where that split meets another split or air or the location where the split is used to ventilate seals or worked-out areas, everyone except those persons required to perform necessary work to correct the problem shall be withdrawn from the affected area. Other than intrinsically safe atmospheric monitoring systems (AMS), all equipment in the affected area shall be de-energized at the source. No other work shall be permitted in the affected area until the concentration of methane in the return air is less than one percent.





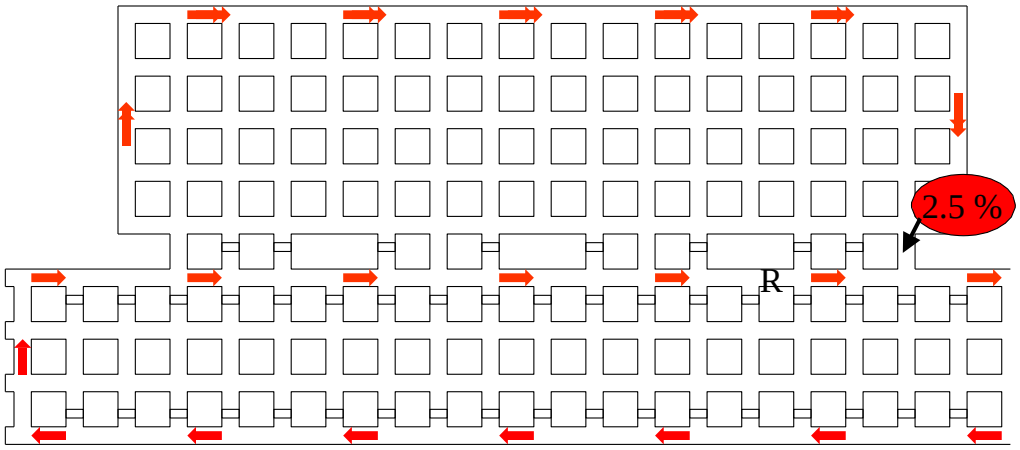
§45.2-839. Actions for excessive methane. Paragraph G

G The concentration of methane in a bleeder split of air immediately before the air in the split joins another split of air, or in a return air course other than described in subsections D and E, ~~shall not exceed two percent~~.

Methane Example

1. Identify problem!

2. <u>Changes or adjustments</u> shall be made to the ventilation system to reduce the concentration of methane in the return air to less than two percent



Active Section

SECTION 6 – COAL DUST AND CONTROL

Coal dust is dangerous because sufficient accumulations, if ignited, will result in an explosion. The fineness (or size of the dust particles) of coal dust determines its explosibility; that is, fine coal dust is more explosive. However, in the presence of the proper conditions, coal dust will explode - even damp coal dust. Only 1/12 of an ounce of coal dust per cubic foot of air is sufficient to propagate a severe explosion. A source of ignition is required to set off a coal dust explosion - usually a methane explosion, an electric arc or explosive detonation.

Coal dust can be controlled by rock dusting and by the proper use of water. Rock dust must satisfy certain requirements and be properly applied in accordance with mine safety laws.

COAL DUST AND CONTROL

All underground areas of a coal mine are required to be rock-dusted to within 40 feet of the working faces. Exceptions to this practice are when the dust is too wet or is not high enough in combustible content to contribute to an explosion.

1. Q. What are the main causes of coal dust explosions?
   A. Explosions of methane, electric arcs, and explosives.

MSHA Miners Circular #36R

2. Q. What benefits are derived from rock dusting?
   A. The explosibility of coal dust and the danger of an explosion being propagated are reduced.

MSHA Miners Circular #36R

3. Q. What effect does the presence of small amounts of methane have on the explosibility of coal dust?
   A. It increases the explosibility.

MSHA Miners Circular #36R

4. Q. What effect does the volatile matter in coal have on its explosibility?
   A. An increase in volatile matter tends to increase its explosibility.

MSHA Miners Circular #36R

5. Q. What may cause the propagation of explosions throughout large areas of mines?
   A. Coal dust.

MSHA Miners Circular #36R

6. Q. How does coal dust contribute to the severity of an explosion?
   A. Because if coal dust is suspended in the air and ignited, the explosion is propagated throughout the mine.

MSHA Miners Circular #36R

7. Q. When is it possible to have an explosion in a coal mine with no methane present?
   A. When quantities of coal dust are raised into suspension in the presence of a source of ignition.

MSHA Miners Circular #36R

8. Q. Under what circumstances does coal dust explode?
   A. When the particles are suspended as a cloud in the presence of flame or spark.

MSHA Miners Circular #36R

9. Q. Which coal dust in Virginia will not explode?
   A. All coal dust in Virginia will explode.

MSHA Miners Circular #36R

10. Q. What effect does fineness of coal dust have on its explosibility?
    A. Fineness will increase the explosibility.

MSHA Miners Circular #36R

11. Q. How can the explosibility of coal dust be reduced?
    A. By the addition of incombustible material (rock dust).

MSHA Miners Circular #36R

12. Q. What type of rock dust should be used?
    A. Dust with a low free-silica content.

30 CFR §75.2

13. Q. What is the maximum percentage of silica allowed in rock dust?
    A. A maximum of five percent.

30 CFR §75.2

14. Q. What shall be the size of rock dust?
    A. All will pass through a 20-mesh screen and not less than 70 percent will pass through a 200-mesh screen.

30 CFR §75.2

15. Q. What are the largest-size particles of coal dust that will start an explosion?
    A. Particles of coal dust that will pass through 20-mesh screen are the largest size that will start an explosion.

30 CFR §75.400.1

16. Q. Will damp coal dust explode?
    A. Yes. Dampness causes the dust particles to cohere, and a greater force is required to separate and raise into suspension. However, once in suspension if ignited, damp coal dust will explode.

30 CFR §75.401-402.1; §75.402.2

17. Q. What does the term “too wet” mean?
    A. That sufficient natural moisture is retained by the dust, that moisture is exuded when squeezed.

30 CFR §75.402.1

18. Q. After applications of rock dust are made in a coal mine, how may the incombustible content of the mine be determined?
    A. By collecting samples of dust from the sides, roof and floor and analyzing them for total incombustibility with a device known as a "volumenometer," or by proximate analysis.

30 CFR §75.403

19. Q. What shall be the minimum percentage of incombustible material after rock dust has been applied in the intake airway?
    A. Eighty percent.

30 CFR §75.403

20. Q. What is the principal explosion hazard in preparation plants?
    A. Accumulations of coal dust.

30 CFR §77.202

21. Q. Who shall be required to wear respirators?
    A. Miners exposed for short periods to gas, dust, fumes, and mist.

§45.2-854.

22. Q. Where should coal dust not be allowed to accumulate?
    A. In all areas of the mine.

§45.2-851.

23. Q. What is the main reason that coal dust is dangerous?
    A. It could result in an explosion, if raised into suspension and ignited.

§45.2-851.

24. Q. What should be done before fine coal dust is loaded from haulageways?
    A. Water or other dust-allaying materials should be applied.

§45.2-851.B.

25. Q. How shall unusual quantities of coal dust be kept out of suspension?
    A. By sprinkling water or by using other dust-allaying devices.

§45.2-851.B.

26. Q. How close to working faces must rock dust be applied?
    A. In and beyond the last open breakthrough to within 40 feet of the working face areas.

§45.2-852.

27. Q. How should dry and dusty areas be treated?
    A. They should be thoroughly rock dusted.

§45.2-852.

28. Q. What areas shall be rock dusted?
    A. All entries, parts of mines or sections if conditions are found to be dusty so as to constitute a hazard.

§45.2-852.

29. Q. What should be done with float dust which accumulates on rock dusted surfaces?
    A. Float coal dust shall be removed and the area rock dusted.

§45.2-852.

30. Q. What shall be done with accumulations of fine, dry coal dust in a mine or on electrical equipment?
    A. The coal dust shall be removed.

§45.2-852.

31. Q. What shall not be allowed to accumulate in tipples, preparation plants, etc.?
    A. They shall be kept free from excessive accumulations of coal dust.

§45.2-925.

SECTION 7 – MINE FIRES AND EXPLOSIONS

MINE FIRES

1. Q. What hazard may be created by wooden structures inside a mine?
   A. The hazard of fires.

   MSHA Miners Circular #36R

2. Q. What are some of the principal causes of mine fires?
   A. Open lights, smoking, electric sparks, heating of electrical equipment, ignition of gas, blasting, and spontaneous combustion.

   MSHA Miners Circular #36R

3. Q. What methods have been used to control or extinguish mine fires?
   A. (a) Chemicals, cardox, rock dust or sand
   (b) Enclosing affected areas with seals
   (c) Flooding affected areas
   (d) Foam and liquid nitrogen

   MSHA Miners Circular #36R

4. Q. Under what conditions may rock dust be used to extinguish a mine fire?
   A. When the fire can be approached close enough that rock dust can be applied directly upon the burning material.

   MSHA Miners Circular #36R

5. Q. What is the most effective means of applying rock dust to a mine fire?
   A. The use of a high-pressure rock dusting machine.

   MSHA Miners Circular #36R

6. Q. How may rock dust be used effectively to extinguish a mine fire?
   A. By coating the fire with a thick layer of rock dust.

   MSHA Miners Circular #36R

7. Q. What advantages does rock dust have over the use of water in extinguishing a mine fire?
   A. Rock dust can be carried by the air current and deposited upon the fire; it will eliminate the formation of steam and water gas; it protects the roof from deterioration caused by steam and water.

   MSHA Miners Circular #36R

8. Q. What is the safest and most effective means of controlling a serious mine fire?
   A. Sealing is the safest and most effective means of controlling a serious mine fire.

MSHA Miners Circular #36R

9. Q. When should a mine fire be sealed?
   A. When it is not reasonably safe to employ direct methods of fighting it.

MSHA Miners Circular #36R

10. Q. What is probably the best material to use for sealing a mine fire?
    A. Cement block.

MSHA Miners Circular #36R

11. Q. When is it advisable to fight a mine fire by flooding?
    A. Only when it is otherwise inaccessible and local conditions are favorable.

MSHA Miners Circular #36R

12. Q. Why is it not advisable to fight a mine fire by flooding?
    A. (a) Heavy damages to the mine and equipment
    (b) Expense of dewatering
    (c) Impossibility of confirming if the fire is extinguished
    (d) Period of non-productivity
    (e) Possibility of generating explosive and dangerous gases by insufficient amount of water on the fire area

MSHA Miners Circular #36R

13. Q. What is a positive indication that a fire exists in a mine?
    A. Carbon monoxide and/or smoke in the mine.

MSHA Miners Circular #36R

A portable foam generator illustrating the polyethylene tubing used in some events.

Sealing Mine Fires

1. Q. How can the risks of mine fires be reduced?
   A. By the use of closed lights, permissible explosives, and approved electrical installations; by sealing abandoned areas; by careful supervision; by not permitting smoking; and by using safe practices when welding and using cutting torches.

   MSHA Miners Circular #36R

2. Q. If a mine fire is discovered on the intake, what should be done to protect the miners inside the mine from smoke and dangerous gases?
   A. The air from the fire should be short-circuited from the miners and workers must be moved to an area outside the fire area.

   MSHA Miners Circular #36R

3. Q. What precautions should be taken to protect workers attempting to extinguish a mine fire?
   A. The firefighting crew should be protected with fresh air or be equipped with all-service gas masks or oxygen breathing apparatus.

   MSHA Miners Circular #36R

4. Q. If a fire occurs in a mine, should the fan be stopped?
   A. Only when so decided by supervision in charge who are experienced in rescue and recovery operations. (It is usually inadvisable to stop the fan).

   MSHA Miners Circular #36R

5. Q. What is the primary consideration in fighting mine fires?
   A. To provide for the safety of the miners engaged in the work.

   MSHA Miners Circular #36R

6. Q. What is the danger of reversing the air current in the event of a mine fire?
   A. Gases formed by the fire may become explosive when mixed with fresh air and may explode when drawn across the fire and irrespirable air may be drawn over miners attempting to escape.

   MSHA Miners Circular #36R

7. Q. How may gob fires in abandoned areas be avoided?
   A. By sealing to exclude oxygen.

   MSHA Miners Circular #36R

8. Q. What combustible and dangerous gases may be formed by the application of water to a mine fire?
   A. Water gas (carbon monoxide and hydrogen).

MSHA Miners Circular #36R

9. Q. What is the purpose of sealing a mine fire?
   A. To cut off the supply of oxygen.

MSHA Miners Circular #36R

10. Q. What are the principal hazards in sealing mine fires?
    A. Explosive and asphyxiating gases.

MSHA Miners Circular #36R

11. Q. How may the danger of an explosion following a mine fire be minimized?
    A. By sealing a large area, enclosing the fire.

MSHA Miners Circular #36R

12. Q. If a mine fire is located on the return from an extremely gassy section, what precaution should be taken?
    A. The air should be short-circuited to prevent the gas from being carried across the fire area.

MSHA Miners Circular #36R

13. Q. What is the essential requirement of permanent fire seals?
    A. They should be as airtight as possible.

MSHA Miners Circular #36R

14. Q. How can the condition of a fire in a sealed area be evaluated?
    A. By analysis of air samples collected from behind the seals.

MSHA Miners Circular #36R

15. Q. How does the action of a mine fire cause explosive gases to be formed?
    A. By distillation of combustible gases from the coal and surrounding carbonaceous shales and by chemical reaction between carbon of the coal, oxygen of air and coal, and hydrogen from water at a high temperature.

MSHA Miners Circular #36R

16. Q. What would a continued high oxygen content in a sealed fire area indicate?
    A. A leakage of air into the sealed area.

MSHA Miners Circular #36R

17. Q. What effect does the barometric pressure have on a sealed area underground?
    A. An outside barometric pressure higher than the pressure behind the seals will create pressure inward toward the sealed area and will have the opposite effect if the barometric pressure is lower outside.

MSHA Miners Circular #36R

18. Q. How would an air analysis indicate that a fire in a sealed area is extinguished?
    A. By low oxygen content and the absence of carbon monoxide.

MSHA Miners Circular #36R

19. Q. What are the two most dangerous gases encountered in mine fires?
    A. Carbon monoxide and methane.

MSHA Miners Circular #36R

20. Q. What changes occur to the atmosphere within a sealed fire area?
    A. Within a fire area, oxygen decreases and carbon dioxide increases. Carbon monoxide increases in fire areas, but gradually decreases as the fire is extinguished. Also, explosive gases may accumulate.

MSHA Miners Circular #36R

21. Q. What would a fluctuating, high carbon monoxide concentration in a sealed fire area indicate?
    A. A leakage of air into the sealed area, keeping the fire active.

MSHA Miners Circular #36R

22. Q. What is the first thing to do upon discovery of a raging mine fire?
    A. Withdraw all miners from the mine, except those engaged in fighting the fire.

MSHA Miners Circular #36R

23. Q. How may the danger of an explosion be minimized during sealing of a fire area?
    A. By sealing sufficiently far away to prevent explosive mixtures from forming before seals can be completed.

MSHA Miners Circular #36R

24. Q. What type of fire seals should be erected first?
    A. Temporary seals.

MSHA Miners Circular #36R

25. Q. Why should temporary seals be erected first to seal a mine fire?
    A. Quickness of erection of temporary seals reduces the exposure of the miners to the danger of an explosion.

MSHA Miners Circular #36R

26. Q. What material should be used for temporary fire seals?
    A. Multiple layers of brattice cloth or plastic tight against the ribs, roof and floor; or plastered wood seals.

MSHA Miners Circular #36R

27. Q. How does a temporary seal exclude oxygen from the fire area?
    A. Prevents oxygen from reaching the fire area.

MSHA Miners Circular #36R

28. Q. During what period after a fire seal has been built is there danger of an explosion?
    A. While the oxygen content remains above twelve percent.

MSHA Miners Circular #36R

29. Q. Under what circumstances may methane accumulate in the presence of a fire without the danger of an explosion?
    A. When the rate of liberation is not sufficient to produce an explosive mixture after the oxygen concentration has been reduced to below twelve percent.

MSHA Miners Circular #36R

30. Q. What is the principal danger while mine fires are being sealed?
    A. The danger of a gas explosion.

MSHA Miners Circular #36R

31. Q. How can excessive internal water pressures be relieved from a sealed area without permitting air to enter?
    A. Through a water trap.

§45.2-837.

32. Q. How may permanent seals be made relatively airtight?
    A. By “hitching” them into the floor, roof and ribs and then coating the seals in accordance with sealing provisions of the approved bleeder plan.

§45.2-845.B.

33. Q. What type material should be used to construct permanent seals?
    A. They should be substantially constructed of incombustible material.

§45.2-845.B.

Unsealing Mine Fires

1. Q. To what extent should electricity be allowed in a mine during the unsealing of a fire area?
   A. Electricity should be cut off to the entire mine?

MSHA Miners Circular #36R

2. Q. What procedure is used when a sealed fire area is recovered by direct ventilation?
   A. Crews wearing self-contained oxygen breathing apparatus break the seal on the intake side, behind a previously constructed air lock, and ,after exploring the affected area, break the return seal and re-ventilate the area. Airlocks are constructed and newly explored areas are re-ventilated as crews advance into the mine.

MSHA Miners Circular #36R

3. Q. How will an oily shale roof and a high volatile coal affect conditions otherwise favorable to reopening a fire seal?
   A. Heat will be retained longer and the danger of rekindling will be increased.

MSHA Miners Circular #36R

4. Q. How may a sealed fire area between intake and return airways be affected by the difference in pressure?
   A. The difference in pressure may create an air leakage across the fire area.

MSHA Miners Circular #36R

5. Q. What effect does barometric pressure have on a sealed fire area?
   A. Variations of the pressure will result in air leakage around the fire seals in the direction of the lower pressure.

MSHA Miners Circular #36R

6. Q. What are the major factors in determining when a fire seal should be broken?
   A. The major factors are the composition of the fire gases (as found by chemical analysis) and the correct interpretation of the composition.

MSHA Miners Circular #36R

7. Q. What should be done to determine when a sealed fire area should be opened?
   A. Samples of air should be taken from behind the sealed area and chemically analyzed. Opening is usually not attempted until the oxygen and carbon monoxide levels have stabilized near zero percent.

MSHA Miners Circular #36R

8. Q. What does the presence of carbon monoxide in a sealed fire area indicate?
   A. It indicates an active or recently active fire.

MSHA Miners Circular #36R

9. Q. What should be totally absent from the air samples before an attempt is made to unseal a fire area?
   A. Carbon monoxide.

MSHA Miners Circular #36R

10. Q. What deficiency of oxygen in a methane-air mixture renders an explosion impossible?
    A. When the oxygen is reduced to twelve percent.

MSHA Miners Circular #36R

11. Q. Why is it not advisable to unseal a fire shortly after the carbon monoxide has disappeared and the oxygen content is reduced to about one percent?
    A. Sufficient time should be allowed for the area to cool to minimize the danger of rekindling of the fire.
    .

MSHA Miners Circular #36R

12. Q. What is the best method of sampling the atmosphere in a sealed area?
    A. Vacuum tube and/or vacuum pump.

MSHA Miners Circular #36R

13. Q. Why should careful consideration be given to the problem of unsealing a fire area?
    A. The dangerous character of the gases makes the operation extremely hazardous.

MSHA Miners Circular #36R

14. Q. Why should ventilation be restored to a fire area gradually and systematically after unsealing a fire area?
    A. To be assured that all places are cleared of gas before miners enter and to prevent explosive mixtures from forming because of an increase of oxygen.

MSHA Miners Circular #36R

15. Q. How does the effect on oxygen differ for a raging fire from the effect produced by a smoldering fire?
    A. The oxygen will be reduced faster in the presence of a raging fire.

MSHA Miners Circular #36R

16. Q. To what percent should oxygen be reduced before it is advisable to attempt to open a fire seal?
    A. One percent (or lower).

MSHA Miners Circular #36R

17. Q. Why is it necessary to have a low oxygen content before a fire seal is opened?
    A. A low percentage of oxygen will lessen the danger of a fire existing and will prevent an explosive methane-oxygen mixture.

MSHA Miners Circular #36R

18. Q. What is the effect of carbon dioxide created by a fire on extinguishing a mine fire in a sealed area?'
    A. Practically none.

MSHA Miners Circular #36R

19. Q. What preparatory work is necessary prior to unsealing a mine fire?
    A. Preparation should be made for the fire gases to pass directly to the main return, and all areas outby the sealed fire area should be heavily rock dusted.

MSHA Miners Circular #36R

20. Q. When should air locks be used to recover a fire area?
    A. When the sealed area is extensive and it is not known whether or not the fire has been extinguished.

MSHA Miners Circular #36R

21. Q. What is the procedure in using air locks to recover a sealed fire area?
    A. Apparatus crews advance short distances inside of air locks and, after erecting new seals with provisions for air locking, re-establish ventilation to the new base and repeat this procedure.

MSHA Miners Circular #36R

Explosions

1. Q. What are the principal causes of mine explosions?
   A. Ignition of gas or coal dust, or both, by electric arcs, blown out explosive shots, and smoking.

   Bureau of Mines Report #6344

2. Q. What is the most common source from which mine explosions are started?
   A. Accumulation of explosive mixtures of methane.

   Bureau of Mines Report #6344

3. Q. How many miners should be placed in charge of recovery work in the event of a mine explosion?
   A. Only one person.

   MSHA Miners Circular #36R

4. Q. Who is eligible to be placed in charge of crews on each shift in recovery work after a mine explosion?
   A. Miners with experience and special training in recovery operations.

   MSHA Miners Circular #36R

5. Q. What is the basic cause of mine fires and explosions?
   A. Combustible material, explosive gas, or coal dust coming in contact with an ignition source.

   MSHA Miners Circular #36R

6. Q. What firefighting equipment should be provided for recovery work?
   A. Fire extinguishers of the proper type, rock dust and other firefighting equipment as conditions require.

   MSHA Miners Circular #36R

7. Q. Why is it advisable to have telephones at the fresh air base?
   A. To expedite the transmission of messages and instructions.

   MSHA Miners Circular #36R

8. Q. Why should up-to-date mine maps be available for recovery operations?
   A. To expedite and assist in recovery operations.

   MSHA Miners Circular #36R

9. Q. What type of first aid equipment should be provided for recovery work?
   A. Oxygen inhalators, first aid supplies, stretchers and blankets.

MSHA Miners Circular #36R

10. Q. Before anyone proceeds into a mine after an explosion, what examination should be made?
    A. Return airways should be examined for smoke or indications of fire and authorized only by mine rescue officials.

MSHA Miners Circular #36R

11. Q. What procedure should be followed where miners are completing a shift from recovery operations?
    A. Miners should be checked out of the mine.

MSHA Miners Circular #36R

12. Q. What are the chief factors that determine the location and establishment of a fresh air base in mine recovery work?
    A. The fresh air base must be in fresh air, free from possible contamination by poisonous and explosive gases, secure against roof falls, and readily accessible for rescue and recovery operations.

MSHA Miners Circular #36R

13. Q. When ventilation is being restored, what precautions should be taken at open dead ends and other open areas encountered?
    A. Open dead ends should be ventilated or temporarily sealed.

MSHA Miners Circular #36R

14. Q. What particular danger is present if ventilation is restored following an explosion-before an exploration is made?
    A. Dormant fires may be revived and a second explosion may follow.

MSHA Miners Circular #36R

15. Q. What should be done when fires are found during recovery exploration?
    A. Every effort should be made to extinguish them, if possible. Fires that are inaccessible should be sealed immediately.

MSHA Miners Circular #36R

Barricading

1. Q. What is a barricade?
   A. A stopping erected to prevent gases from entering a portion of the mine where miners may remain safely until rescued.

Dictionary of Mining Terms

2. Q. Have barricades been successful in preserving life following mine fires and explosions?
   A. Yes, in many cases.

Dictionary of Mining Terms

3. Q. What can be done to prevent the gases of an explosion or mine fire from reaching the point where a barricade is intended?
   A. The air can be short-circuited at least 50 feet outby the barricade location and a temporary curtain can be erected.

MSHA Safety Manual No. 2

4. Q. How large an area should be enclosed within the barricade?
   A. As large an area as possible.

MSHA Safety Manual No. 2

5. Q. How may barricades be constructed?
   A. From any suitable material at hand, such as gob, stopping material, ties taken from track, brattice cloth, wood products, etc.

MSHA Safety Manual No. 2

6. Q. How much air does the average person at rest require per hour within a barricaded area?
   A. About one cubic yard per hour.

MSHA Safety Manual No. 2

7. Q. For what approximate length of time may 5 miners be barricaded in an area 100 feet long, 10 feet wide and 5 feet high before they begin to suffer from oxygen depletion?
   A. Approximately 37 hours.
   SOLUTION: 100 x 10 x 5 = cubic feet

$$\frac{\text{5,000 cubic feet}}{\text{27 cubic feet per cubic yard}} = \text{185 cubic yards}$$

$$\frac{\text{185 cubic yards}}{\text{5 miners}} = \text{37 cubic yards per miner}$$

SINCE each miner uses one cubic yard per hour, the air will last 37 hours.

Coal Mine Ventilation Awareness Program MSHA

8. Q. When gases begin to enter a barricade area, what can be done?
   A. If the area is large enough, additional barricades can be built inby the first one erected or the crevices can be plugged.

MSHA Safety Manual No. 2

9. Q. How should a miner conduct himself while located inside a barricade?
   A. A miner should remain quiet, occasionally moving about to mix the air.

MSHA Safety Manual No. 2

10. Q. How can compressed air, if it is available, be of assistance within a barricade?
    A. It can be used to replenish the air.

MSHA Safety Manual No. 2

11. Q. In the event of an explosion after which escape is cut off by afterdamp in all escapeways, what is the safest thing to do?
    A. Short-circuit the ventilation from the area and erect a barricade.

§45.2-819.

Fire Extinguishers

1. Q. What is a Class A fire?
   A. A fire that involves wood, paper, clothing, etc..

MSHA Miners Circular #36R

2. Q. What type extinguishing agents are used to extinguish Class A fires?
   A. Water, rock dust, or fine sand.

MSHA Miners Circular #36R

3. Q. What is a Class B fire?
   A. A fire that involves liquids, petroleum products, grease, etc..

MSHA Miners Circular #36R

4. Q. What type extinguishing agents are used to extinguish Class B fires?
   A. Chemical fire extinguishers such as foam, dry chemicals, liquid carbon dioxide. MSHA

Miners Circular #36R

5. Q. What is a Class C fire?
   A. A fire that involves energized electrical equipment.

MSHA Miners Circular #36R

6. Q. What type extinguishing agents are used to extinguish Class C fires?
   A. Chemical fire extinguishers such as liquid carbon dioxide and dry chemicals. Never use water on a Class C fire unless the electrical circuit has been de- energized.

MS HA Miners Circular #36R

SECTION 8— ELECTRICITY IN MINING

Electrical current used in coal mining (or elsewhere) is one of two types of alternating current or direct current and each type has its advantages. Alternating current (AC) can be transmitted at high-voltages with little line loss and can be easily reduced at the point of consumption, whereas direct current (DC) provides for a wider range of speed but has significant line loss over long distances. Direct current must be used near its source.

The use of electricity can result in shock hazards and explosions from flashes and arcs. Such dangers occur from poor wiring and inadequate insulation and defective components. Dangers can be minimized through proper supervision.

Specific laws govern the use of electricity in underground mining operations. These laws relate to the location of power lines above ground, protection of surface transmission lines, wiring in surface buildings, and the location and characteristics of transformers. In addition, all electrical equipment must be inspected by a properly certified person.

Some of the rules to be followed in the use of electricity include (but are not limited to) the following:

1. Guard, support and insulate all current-carrying wires and cables where applicable. Cable splicing must be in accordance with the Coal Mine Safety Laws of Virginia.

2. Where track is used as a power conductor, weld or bond every joint of both rails of main line track.

3. De-energize, lockout and tag power while electrical work is being performed.

4. Trolley wire and trolley feeder wires should be installed and provided with a very specific set of characteristics with regard to clearance, insulation, guards, anchoring, and maximum load.

5. Effective grounding is essential, and specific state and federal laws must be complied with.

6. All electrical equipment must be provided with circuit breakers, have operating controls easily accessible, and be provided with quick-disconnect devices.

7. All trailing cables must be flame resistant and be provided the proper disconnecting device.

ELECTRICITY

1. Q. What is the unit of electrical pressure?
   A. The volt (E)?

   MSHA Elect. Hazards Program

2. Q. What is the unit of electrical current?
   A. The ampere (I).

   MSHA Elect. Hazards Program

3. Q. What is the unit of electrical power?
   A. The watt (W).

   MSHA Elect. Hazards Program

4. Q. What is the unit of resistance that opposes the flow of electrical current?
   A. The ohm (R).

   MSHA Elect. Hazards Program

5. Q. What instrument is used to measure current?
   A. Ammeter.

   MSHA Elect. Hazards Program

6. Q. What instrument is used to measure voltage?
   A. A voltmeter.

   MSHA Elect. Hazards Program

7. Q. What is the formula to calculate the flow of current in a direct current circuit?
   A. $I = \frac{W}{E}$ or $I = \frac{E}{R}$

   Safety Technology, Inc.

8. Q. What is the formula to calculate the voltage in a direct current circuit?
   A. $E = \frac{W}{I}$ or $E = IR$

   MSHA Elect. Hazards Program

9. Q. What is the formula to calculate power consumed by a direct current circuit?
   A. $W = IE$

   MSHA Elect. Hazards Program

10. Q. How many watts are equal to one horsepower?
    A. 746 watts.

    MSHA Elect. Hazards Program

11. Q. What is a kilowatt?
    A. 1,000 watts.

    MSHA Elect. Hazards Program.

12. Q. How many kilowatts are used to develop 50 horsepower?
    A. 50 x 746 = 37,300 watts = 37.3 kilowatts.

MSHA Elect. Hazards Program.

13. Q. What are some of the advantages of alternating current in mining operations?
    A. Alternating current permits transmission at high-voltages with little loss of energy.

MSHA Elect. Hazards Program.

14. Q. What is a disadvantage of direct current?
    A. The comparatively low voltage required for mining can be used economically only within a limited distance from its source of generation.

MSHA Elect. Hazards Program

15. Q. What is the effect of distance upon direct current voltage?
    A. The voltage is decreased by line loss due to the resistance of the conductors.

MSHA Elect. Hazards Program

16. Q. How can excessive line loss be avoided?
    A. By sufficient current carrying capacity in the conductors, by adequate bonding, and by locating generating equipment near the point of operation.

MSHA Elect. Hazards Program

17. Q. What are the main considerations in selecting a motor for a particular service?
    A. That it has sufficient rated capacity and the proper characteristics for the service intended.

MSHA Elect. Hazards Program.

18. Q. What is the effect of continued overload or undervoltage on operating motors?
    A. Heating will break down motor insulation.

MSHA Elect. Hazards Program.

19. Q. How can a motor be protected from undervoltage?
    A. By undervoltage release coils.

MSHA Elect. Hazards Program

20. Q. How can the risk of danger of fire from an operating motor be reduced?
    A. By protective devices, workmanlike installation, and clean and incombustible surrounding .

MSHA Elect. Hazards Program

21. Q. What are the common causes of arcing in a motor?
    A. Poor connections, uncleanliness, or defective components.

MSHA Elect. Hazards Program.

22. Q. What usually causes a motor to overheat with the proper voltage applied?
    A. Loose brushes or poorly made connections.

MSHA Elect. Hazards Program

23. Q. How can the danger of explosions from operating motors be reduced?
    A. By the use of permissible electrical equipment used in a permissible manner.

30 CFR Part 18

24. Q. How is the permissibility of equipment commonly destroyed?
    A. By improper maintenance.

30 CFR Part 18

25. Q. What is the effect of dust and dirt between the joints of permissible enclosures?
    A. Permissibility is destroyed when the joint cannot be closed tightly enough to provide the required cooling action.

30 CFR Part 18

26. Q. What is meant by flameproof electrical equipment?
    A. Flameproof equipment has a wire gauze to cool flames escaping from the interior.

30 CFR Part 18

27. Q. Why is flameproof electrical equipment not permissible?
    A. The general construction is not adequate to meet the requirements for permissibility.

30 CFR Part 18

28. Q. How is a possible explosion inside permissible enclosures cooled before reaching the outside air?
    A. By the cooling action of wide metal surfaces at the joints and by the rapid expansion of combustible products escaping through narrow openings at joints.

30 CFR Part 18

29. Q. What is the maximum clearance of a plane-flange joint?
    A. 0.004 inch.

30 CFR Part 18

30. Q. What is the maximum clearance of a step-flange joint?
    A. 0.006 inch.

30 CFR Part 18

31. Q. What is necessary to establish identification of permissible equipment?

A. An MSHA approval plate.

30 CFR Part 18

32. Q. When is an electrical device considered explosion-proof?
A. An electrical device is considered explosion-proof when provisions are made such that any explosion occurring within the device will be sufficiently cooled before reaching the outside so that an ignition of a surrounding explosive mixture cannot occur.

30 CFR Part 18

33. Q. Headlights and red reflecting material shall be provided on both front and rear of each unit of mobile transportation equipment that travels at a speed, which exceeds:
A. 2.5 mph

30 CFR Part 18

34. Q. What is meant by permissible electrical equipment?
A. Equipment that has been approved by MSHA.

30 CFR Part 18

35. Q. Under what conditions is an electrical device considered permissible?
When all requirements of the device are constructed and maintained according to MSHA requirements.

30 CFR Part 18

36. Q. How often should high-voltage rubber gloves be tested?
A. Once each month.

30 CFR §75.705-8

37. Q. How often shall circuit breakers and their auxiliary devices protecting underground high-voltage circuits be tested and examined?
A. At least once each month.

30 CFR §75.800-3

38. Q. Why is enclosed electrical equipment, such as transformers and rectifiers, not permissible?
A. Their construction will not confine flames.

30 CFR Part 18

39. Q. What protective devices shall be installed on each exposed power circuit that leads underground?
A. Approved lightning arrestors.

§45.2-803.B.

40. Q. How high a fence is required to surround all surface high-voltage substations that

are not enclosed or not elevated eight feet or more?

A. Six feet.

§45.2-804.A.

41. Q. What type safeguards must be provided for metal fences that surround surface substations?

A. Grounded effectively, and gates to the fence must be kept locked at all times unless persons authorized to enter the gate or enclosure are present.

§45.2-804.A.

42. Q. What types of underground transformers must be used?

A. They shall be air cooled or cooled with nonflammable liquid or inert gas.

§45.2-805.

43. Q. What are the principal dangers created by electrical installations inside the mine?

A. Mine fires and electrical hazards.

§45.2-806.

44. Q. How must battery charging stations, motor generator sets, rotary converters, and oil-filled transformers be installed?

A. In fireproof structures ventilated by a separate split of air that is directed into a return air course.

§45.2-838.C.

45. Q. What power wires shall be supported on insulators?

A. All power wires, except trailing cables, specially designed cables used as electrical conductors to underground rectifier or transformer stations, portable power cables, and bare or insulated ground and return wires.

§45.2-807.B.

46. Q. What is the purpose of track bonding?

A. To provide a continuous return circuit of low resistance.

§45.2-807.H.

47. Q. What is the result of poor track bonding?

A. Poor electrical transmission, arcing and ineffective electrical protective devices.

§45.2-807.H.

48. Q. What are the hazards of poor track bonding?

A. Mine fires, explosions, electric shocks, stray current and electrolysis.

§45.2-807.H.

49. Q. To what type equipment shall grounding not be made?
    A. To un-bonded conveyor units or un-bonded track.

§45.2-807.H.

50. Q. Where shall bonds be placed on main-line track?
    A. Rails and switches shall be bonded at every joint and cross-bonded at 200 foot intervals in such a manner so as to provide an adequate electrical return circuit.

§45.2-807.H.

51. Q. How should switches be bonded?
    A. Well bonded.

§45.2-807.H.

52. Q. How can poor bonding be detected?
    A. By the reading of a bond-tester connected across the joints, arcing and a poor electrical return.

§45.2-807.H.

53. Q. Why should trolley and trolley feeder circuits be kept away from working faces in coal mines?
    A. In possible accumulations of methane, trolley wires should not extend beyond any open crosscut and shall be kept 150 feet from active pillar workings.

§45.2-808.G.

54. Q. What must be done with metallic frames, casings, and other enclosures of stationary electrical equipment that can become “alive” through failure of insulation or contact with energized parts?
    A. They shall be grounded effectively or equivalent protection shall be provided.

§45.2-809.

55. Q. Why should pipe lines be grounded?
    A. To prevent stray current from causing electrolysis.

§45.2-809.

56. Q. What is the purpose of the ground monitoring (ground check) circuit in a mine electrical system?
    A. To make sure that ground wires are continuous and properly connected.

§45.2-809.C.

57. Q. What are the dangers associated with electrical systems?
    A. Shock hazards, fires, and explosions.

§45.2-810.

58. Q. What are some of the dangers created by the operation of electrical equipment in coal mining?
    A. Fires from overheated equipment and explosions from unguarded flashes or arcs.

§45.2-810.

59. Q. How may persons be protected from short circuits in electrical machinery?
    A. By grounding the frames or casings and installing properly adjusted circuit breakers.

§45.2-810.B.

60. Q. How shall electric conductors on branch circuits be protected against overloads?
    A. Automatic circuit breaking devices or fuses of the correct type.

§45.2-810.B.

61. Q. How can a motor be protected against overload?
    A. By fuses or automatic circuit breaking devices.

§45.2-810.B.

62. Q. What shall be installed underground in all main power circuits within 500 feet of the bottom of shafts and boreholes, and at other places where main power circuits enter the mine?
    A. Disconnecting switches.

§45.2-810.D.

63. Q. Where shall disconnecting switches be installed in all main power circuits?
    A. Within 500 feet of the bottoms of shafts and boreholes and where main power circuits enter the mine.

§45.2-810.D.

64. Q. How should controller cases be maintained?
    A. Free of holes and installed in safe design, and safe construction.

§45.2-810.E.

65. Q. How should employees be protected from contact with electrical circuits, control and switchboard installations?
    A. By adequate fencing or guarding and by dry wooden platforms or insulated platforms.

§45.2-810.F.

66. Q. Where shall insulating platforms of wood, rubber or other suitable material be placed?
    A. At each switchboard station and at stationary machinery where shock hazards exist.

§45.2-810.F.

67. Q. Where shall suitable "Danger – High-Voltage" signs be posted?
    A. They shall be posted conspicuously at all high-voltage installations.

§45.2-806.A.

68. Q. What are the dangers associated with signal equipment and telephones?
    A. The danger of shock from contact with other electrical circuits and ignition of gas by sparks from improperly maintained equipment.

§45.2-811.

69. Q. Where shall a two-way communication system or telephone facility be located?
    A. Within 500 feet of the main portals.

§45.2-811.A.

70. Q. Who shall be stationed on the surface for communication purposes?
    A. An authorized person.

§45.2-811.A.

71. Q. How can telephone lines other than cables be installed?
    A. Installed on insulators on the opposite side from trolley and power wires.

§45.2-811.B.

72. Q. How shall telephone wires be installed when they cross trolley or power wires?
    A. They shall be insulated adequately.

§45.2-811.B.

73. Q. How shall telephone circuits be protected from lightning?
    A. By the use of lightning arrestors provided at points where the telephone circuit enters the mine, at each telephone located on the surface, and at the point the circuit enters a building or structure.

§45.2-811.C.

74. Q. What is the maximum voltage allowed on underground direct current electrical face equipment?
    A. 300 volts.

§45.2-812.D.

75. Q. How long shall electrical equipment examination records be maintained at the mine?
    A. One year.

§45.2-814.A.

76. Q. How often must underground electrical circuits and equipment be inspected?
    A. Once each week.

§45.2-814.A.

77. Q. How often must surface electrical circuits and equipment be inspected?
    A. Once each month.

§45.2-814.A.

78. Q. What is the first step to take before starting to work on a unit of direct current trolley track equipment?
    A. Remove the trolley pole from the trolley wire.

§45.2-815.

79. Q. What precaution shall be taken before repair work is performed on power circuits and electric equipment?
    A. De-energize, lock out and suitably tag the circuit.

§45.2-815.

80. Q. When shall methane tests be made where electrical equipment is operated?
    A. Before taking electrical equipment inby the last open crosscut, before energizing equipment that remains in face areas and at least every twenty minutes.

§45.2-827.D.

81. Q. At what level of methane is electrical equipment prohibited to be taken into or operated in?
    A. One percent methane.

§45.2-812.C.

82. Q. What should not be permitted to accumulate in electrical compartments enclosing contactors and switches?
    A. Coal dust.

§45.2-852.

Trailing Cables

1. Q. What protection should be provided for high-voltage cables installed in mines?
   A. They should be protected against moisture and mechanical damage.

30 CFR §75.606

2. Q. How should the individual conductors of a high-voltage cable be protected?
   A. By ground shielding tape.

30 CFR §75.804

3. Q. What protection should metallic-sheathed cable have against electrolysis?
   A. The cable sheathing should be grounded at frequent intervals.

30 CFR §75.804

4. Q. What are the requirements of splices for high-voltage cables?
   A. Suitable junction boxes or approved splicing methods should be used to protect against moisture and leakage and to ensure as strong a connection mechanically and electrically as the original cable.

30 CFR §75.810

5. Q. How shall power wires and cables be installed in hoisting shafts, slopes, and bore holes?
   A. They shall be properly insulated, substantially installed, well maintained, and protected with lightning arrestors.

§45.2-807.

6. Q. How shall trailing cables be protected?
   A. By automatic circuit breakers or fuses of the current type and capacity.

§45.2-813.B.

7. Q. How many temporary splices are allowed in a trailing cable?
   A. One.

§45.2-813.D.

8. Q. The outer cover on a trailing cable shall be:
   A. Flame resistant.

§45.2-813.E.3

9. Q. What must be done prior to repairing any energized electrical cable?

A. De-energize, lock out and suitably tag the circuit.

§45.2-815.

10. Q. When a cable has been locked out and tagged, who shall remove the lock and tag?
    A. The person who locked out and tagged the circuit.

§45.2-815.

Circuit Breakers and Switches

1. Q. Within how many feet from where main power circuits enter the mine shall lightning arrestors be provided?
   A. 100 feet.

30 CFR §75.521

2. Q. What are four types of protection provided by circuit breakers?
   A. Short circuit, overcurrent, under voltage, and ground fault.

30 CFR §75.800

SECTION 9—HAULAGE

Haulage is a functional area of coal mining where a large number of fatalities occur. Some primary causes of accidents are: poorly maintained track; defective equipment; insufficient clearance; unsafe practices (such as riding loaded cars); unsafe acts (such as failing to keep track sanding devices operating properly); poorly maintained haulage roads; and scoops or shuttle cars running over people. The subject of belt haulage, track haulage, and man trips shall be discussed in this section.

1. Q. What are the primary requirements of good mine track?
   A. Elements of all haulage roads shall be constructed, installed and maintained in a manner that ensures safe operation of equipment.

§45.2-744.A.

2. Q. What are the primary causes of haulage accidents?
   A. Insecure track, insufficient clearance, and unsafe practices.

§45.2-744.

3. Q. In what condition should haul roads and travelways be maintained?
   A. In clean and orderly condition.

§45.2-744.

4. Q. How shall roadbeds be maintained for haulage equipment?

A. Free of coal spillage and debris and well drained.

§45.2-744.

5. Q. Where shall track switch throws be located?
   A. On the side opposite the trolley wire, when possible.

§45.2-745.

6. Q. What is the minimum clearance space of track equipment on the side opposite the clearance side?
   A. Six (6) inches; when not possible to maintain such clearance, close clearance signs shall be posted inby and outby the affected area.

§45.2-746.

7. Q. Where shall the clearance side along a track be located in relation to the trolley wire?
   A. On the side of the entry opposite the trolley wire.

§45.2-746.

8. Q. What should be done along haulage roads, slopes, and inclines when persons approach moving traffic?
   A. Miners not engaged in haulage operations shall take refuge in shelter holes or other safe locations.

§45.2-746.

9. Q. What clearance shall be maintained on the "safety side" (along entries between the car and the rib, gob, or timbers) for the passage of persons?
   A. Not less than 24 inches.

§45.2-746.

10. Q. What shall be the clearance where supplies are loaded or unloaded?
    A. Twenty-four inches (24").

§45.2-746.

11. Q. What provision should be made in relation to leaving supplies along a haulage track?
    A. All supplies should be unloaded in a breakthrough or other opening where the clearance will not be obstructed, and on the side opposite the trolley wire, unless the wire is adequately guarded.

§45.2-746.

12. Q. What shall be the minimum clearance along each track in sidetracks?
    A. Twenty-four inches (24") on the clearance side and six inches (6") on the side opposite the clearance side or "tight" side.

§45.2-746.

13. Q. What shall be provided where it is necessary for workers to cross conveyor belts?
    A. Suitable crossing facilities.

§45.2-747.

14. Q. What shall be the maximum distance between shelter holes?
    A. Eighty feet, unless permission has been granted by the Chief for a greater distance.

§45.2-748.

15. Q. What is the minimum size required for shelter holes?
    A. Five feet in depth, four feet in width, and as high as the traveling space.

§45.2-748.

16. Q. How shall shelter holes be maintained?
    A. Clear of refuse and other obstructions.

§45.2-748.

17. Q. What protection from moving equipment shall be provided on both sides of permanent doors?
    A. Shelter holes, except where six feet of clearance is maintained.

§45.2-748.

18. Q. What protection from moving equipment shall be provided at switch throws?
    A. Shelter holes, except where six feet of clearance is maintained.

§45.2-748.

19. Q. When should shelter holes be used?
    A. At all times when equipment is passing.

§45.2-748.

20. Q. What protection shall be provided for workers along haulageways?
    A. Shelter holes shall be provided and maintained.

§45.2-749.

21. Q. How shall the brakes on all self-propelled mobile equipment be maintained?
    A. In safe operating condition.

§45.2-751.

22. Q. How shall track-sanding devices on rail equipment be maintained?
    A. In safe operating condition.

§45.2-751.

23. Q. What material shall be provided on rail equipment to increase traction while starting or stopping?
    A. Sand.

§45.2-751.

24. Q. Where shall the operator of a locomotive or other track equipment be located while such equipment is in motion?
    A. In the operators' compartment.

§45.2-752.

25. Q. What safety device is required for re-railing of a locomotive or other track equipment?
    A. Proper lifting devices.

§45.2-752.

26. Q. What shall be provided on all self-propelled mobile track equipment?
    A. Audible warning device, headlights, lifting jack and bar.

§45.2-752.

27. Q. What signaling device shall be provided on locomotives, shuttle cars and self-propelled mobile transportation equipment?
    A. Audible warning device.

§45.2-752.C.

28. Q. How are moving trips required to be lighted?
    A. By a conspicuous light on both the front and rear.

§45.2-752.D.

29. Q. When a trip is uncoupled from a locomotive on a grade, what precautions should be taken?
    A. The locomotive brakes must be set and the cars properly blocked.

§45.2-752.E.

30. Q. What safety device should be used on ascending trips on steep grades?
    A. A drag.

§45.2-752.E.

31. Q. What safety device should be used on descending trips where the locomotive is not adequate to control trips?
    A. Slides or skids.

§45.2-752.E.

32. Q. In what manner shall trips not be operated on main haulageways?
    A. Shall not be pushed, except for switching, clearing switches and sidetracks and approaches to cages, slopes, etc..

§45.2-753.

33. Q. Where is pushing of cars on haulage tracks allowed?
    A. From the last sidetrack to the working section, where necessary to clear switches and sidetracks, and on approach to cages, slopes and surface inclines.

§45.2-752.

34. Q. Why should back poling associated with track and trolley wire systems be avoided?
    A. Obstructions or the trolley pole leaving the wire may cause the pole to break, resulting in serious injury.

§45.2-757.

35. Q. What safety devices should be installed on steep grades?
    A. Derails should be installed.

§45.2-738.D.

36. Q. What devices should be provided to prevent track cars from accidental movement?
    A. Stopblocks, chains, or clevises.

§45.2-738.C.

37. Q. What are some common unsafe haulage practices?
    A. Permitting miners to ride on pushed trips, throwing switches and opening doors in front of moving, trips, riding loaded cars, riding on the front bumpers of cars, leaving unblocked cars on tracks, coupling cars in motion, and getting off or on trips in motion.

§45.2-756.

38. Q. What are the duties of motormen and trip riders in relation to other persons riding on locomotives or loaded cars?
    A. They shall not permit such unsafe practices.

§45.2-756.

39. Q. Who may ride on loaded cars or on the outside of a car?
    A. No person.

§45.2-756.B.

40. Q. When shall miners not get on or off cars?

A. When the cars are in motion.

§45.2-756.C.

41. Q. Who is allowed to ride on loaded cars?
    A. No one.

§45.2-756.B.

42. Q. Who is allowed to ride on top of any self-propelled mobile equipment?
    A. No one.

§45.2-756.D.

43. Q. Where is back poling allowed?
    A. Where the pole cannot be reversed or when going up extremely steep grades and then only at a very slow speed.

§45.2-757.

44. Q. When shall operators of self-propelled haulage equipment sound the warning device?
    A. Before starting such equipment, approaching any curve, sidetracks, doors, curtains, manway crossings, and other place where a miner is or is likely to be.

§45.2-758.C.

45. Q. In what direction shall shuttle car operators face?
    A. In the direction of travel.

§45.2-758.A.

46. Q. How may mine cars be coupled safely?
    A. By use of automatic couplers which couple on impact and uncouple without the need for persons to position themselves between such equipment.

§45.2-758.B.

47. Q. When two pieces of self-propelled mobile mining equipment are traveling in opposite directions on the same haulage road, are they allowed to pass each other while both are in motion?
    A. No.

§45.2-758.F.

48. Q. How many feet shall be maintained between locomotives, supply trips, mantrips or other track equipment?
    A. Three hundred feet (300').

§45.2-758.D.

49. Q. Where a dispatcher is employed to control traffic, when shall traffic move?

A. Traffic under his jurisdiction shall be moved only at his direction.

§45.2-759.

50. Q. How shall man trips be pulled by locomotives?
    A. They shall be pulled at safe speeds consistent with the condition of roads and type of equipment used, and shall be controlled such that they can be stopped within the limits of visibility.

§45.2-761.A.

51. Q. What is the duty of motormen in relation to the speed of transportation and other track equipment?
    A. Operated at a safe speed and kept under full control at all times.

§45.2-761.

52. Q. How should motormen operate trips when approaching and passing through doors or curtains?
    A. At reduced speed and under full control, capable of an immediate stop.

§45.2-761.

53. Q. Who shall be in charge of each man trip?
    A. An authorized person.

§45.2-761.B.

54. Q. How shall man trip cars be maintained?
    A. In safe operating condition and in a sufficient quantity to prevent overloading.

§45.2-761.C.

55. Q. Where should workers not be allowed to ride on track-trolley-wire systems?
    A. On the trolley wire side, unless suitable covered man cars are used.

§45.2-761.D.

56. Q. What must be provided on man trip cars where trolley wires are located above mining personnel?
    A. Man trip car must be covered.

§45.2-761.

57. Q. What type tools or supplies can be hauled with people on man trip cars?
    A. Only small hand tools or supplies that can be carried on the person or in special compartments of the man trip.

§452-761.

58. Q. What must be provided on trolley wires at man trip stations where there is a possibility of coming in contact with trolley wires?
    A. Trolley wires must be adequately guarded.

§45.2-761.

59. Q. Where shall miners not get on or off cars?
    A. On the same side as trolley wire, except where protection, guarding and clearance are provided.

§45.2-761.

60. Q. What shall be provided where employees board or leave conveyor belts that are approved for transportation of workers?
    A. Adequate clearance, proper illumination, control switches and a responsible person in attendance.

§45.2-763.D.

61. Q. When employees are being transported by conveyor belt and the belt travels 250 feet per minute, what is the minimum distance required between the belt and roof or any overhead projection?
    A. Eighteen inches (18”).

§45.2-763.

62. Q. What is the maximum speed allowed for a belt when employees are riding if the distance between the belt and roof or any overhead projection is 24 inches or more?
    A. Three hundred feet (300’) per minute.

§45.2.763.

63. Q. What is the minimum clearance required between the conveyor belt and roof or any overhead projection for transportation of employees?
    A. Eighteen inches (18”).

§45.2-763.

64. Q. What is the minimum spacing required for employees while riding conveyor belts?
    A. Five feet (5’).

§45.2-763.

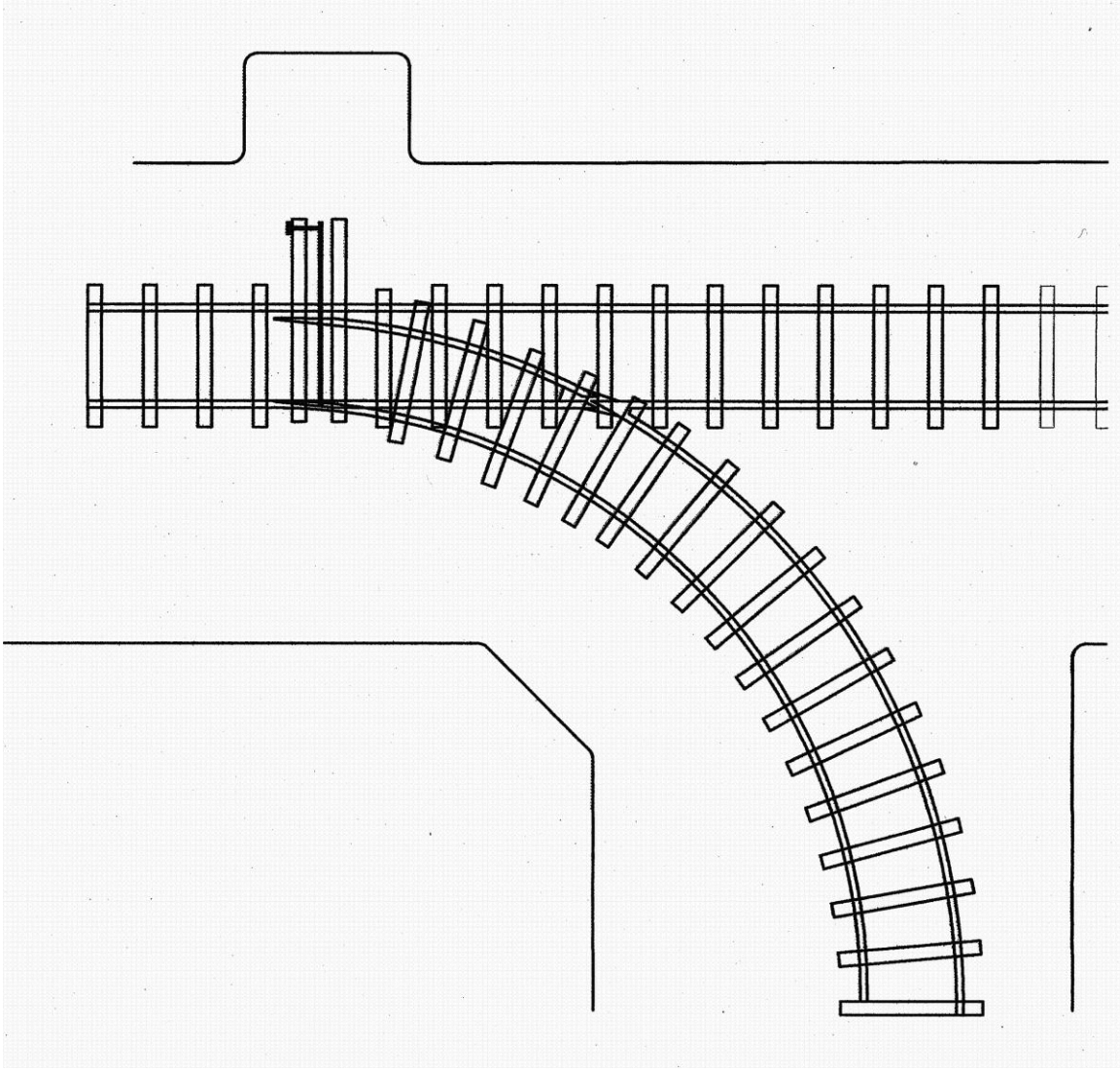
65. Q. What are the specific duties of motormen and brakemen in relation to ventilation doors?
    A. They should not damage or block ventilation doors or permit them to remain open.

§45.2-842.

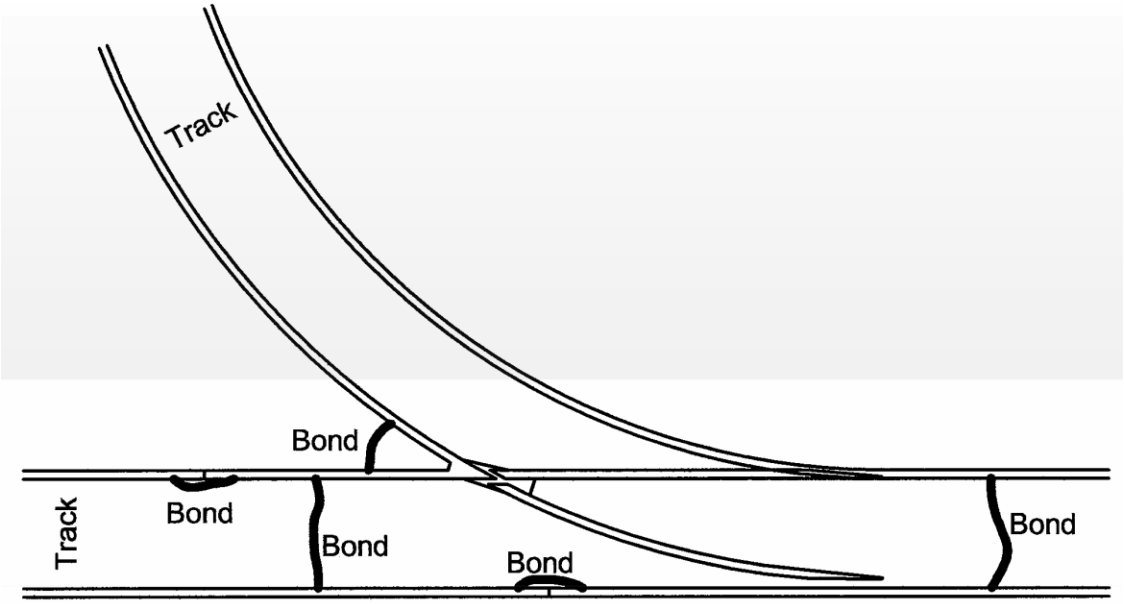
66. Q. How shall mantrips not be operated?
    A. By being pushed.

30 CFR §75.1403-7 (c)

Haulage (Continued)



Radius of Curve. The length of the radius refers to the distance from the turning point (point of switch) of the curve to the centerline of the track. The measurement is made between point of switch and the center line survey station of the room. In this sketch, the measurement is taken from the point of the right-hand switch to the survey station.



Correct method of bonding around a track turnout.

SECTION 10 – UNDERGROUND DIESEL POWERED EQUIPMENT

Diesel powered equipment is permitted underground only with written approval of the Chief. Before diesel powered equipment can be checked for approval, the operator must submit a plan to the Chief. The plan shall contain the ventilation plan that specifies the quantities of air in the area where the diesel units will operate and the number of diesel units, which the operator plans to operate. If the operator exceeds the specified number of units, an amendment must be submitted. The plan must also contain the projected quantities of diesel fuel to be used in a twenty-four (24) period of time.

The air quality in which diesel powered equipment is operated shall be sampled at required intervals and proper locations to determine that the composition of the air is within required limits.

Maintenance of diesel-powered equipment shall be performed by a certified diesel engine mechanic. Maintenance means all tasks required to be performed routinely to ensure that the engine exhaust emissions conform with the requirements of the laws and regulations of Virginia and with the maintenance recommendations of the manufacturer of the engine.

Diesel fuel for underground diesel equipment must conform to applicable requirements. The mine operator shall maintain on the mine site, and make available for inspection, a statement certifying the sulfur content of the diesel fuel to be used underground.

Requirements

1. Q. Is diesel powered equipment permitted in underground coal mines?
   A. Yes.

   Diesel Regulations 4 VAC 25-90-20 A

2. Q. Who grants approval to use diesel powered equipment underground?
   A. The Chief.

   Diesel Regulations 4 VAC 25-90-20 A

3. Q. What must be submitted to Coal Mine Safety before diesel powered equipment can be checked for approval?
   A. A plan, which shall contain quantities of air and number of diesel units.

   Diesel Regulations 4 VAC 25-90-20 A

4. Q. Can the approval to use diesel power underground be revoked?
   A. Yes, for failure to comply with laws and regulations.

   Diesel Regulations 4 VAC 25-90-20 B

5. Q. Who is required to perform maintenance on underground diesel engines?
   A. A certified diesel engine mechanic.

Diesel Regulations 4 VAC 90-40 D

6. Q. Can any diesel fuel be used to power underground diesel equipment?
   A. No. Only diesel fuel which conforms to the requirements of 5.1 of the Diesel Regulations is allowed.

Diesel Regulations 4 VAC 90-40

SECTION 11 – EXPLOSIVES AND BLASTING

Only "permissible" explosives are allowed to be used in underground coal mines. Permissible explosives are those, which have passed certain rigid tests conducted by MSHA. There are various types of permissible explosives, but each must have the word "permissible" stamped on it. Permissible explosives may be rendered nonpermissible by improper storage, transportation, handling and use.

The primary reason for using permissible explosives is safety. These explosives have a flame-depressant additive, which minimizes the probability of gas or dust explosions in underground coal mines.

Storage and transportation of explosives are vital subject areas. Acceptable practices and procedures must be understood and followed diligently. Explosives can only be charged, stemmed, and fired by a **Certified Shot Firer**. Also, the foreman must be familiar with various methods of cutting and drilling of coal. All mine foremen should be familiar with the management of misfires and should assist shot firers with such dangerous conditions.

Permissible Explosives

1. Q. What poisonous gases are liberated when explosives are fired?
   A. Carbon monoxide and oxides of nitrogen.

   Dictionary of Mining Terms

2. Q. What is the principal ingredient in a permissible explosive generally used for shooting coal?
   A. Ammonium nitrate.

   Dictionary of Mining Terms

3. Q. What are the characteristics of the flame that determine the permissibility of an explosion?
   A. Short flame of short duration.

   §45.2-722.

4. Q. How are permissible explosives designed?
   A. To minimize the probability of a gas or dust explosion.

   §45.2-722.

5. Q. What causes permissible explosives to deteriorate?
   A. Moisture, improper storage or age.

   §45.2-722.

6. Q. How must permissible explosives be fired?
   A. By proper strength electric detonators.

§45.2-722.

7. Q. What type of blasting unit must be used to fire permissible explosives?
   A. A permissible shot-firing unit, unless otherwise approved by the Chief.

§45.2-722.

8. Q. How must permissible explosives be stemmed?
   A. Properly confined in a hole with incombustible stemming material at least 24 inches in length or one-half the length of the hole (if the hole is less than four feet in depth).

§45.2-722.

9. Q. What must be the condition of the area before permissible explosives are fired?
   A. Shots shall not be fired in any area where a methane level of one percent or greater can be detected.

§45.2-722.

10. Q. What is the maximum charge of permissible explosives for one hole six feet or more in depth?
    A. Three pounds.

§45.2-722.

11. Q. To remain permissible, how must the coal be prepared before permissible explosives are fired?
    A. The coal must be cut or sheared, unless written permission is granted by Coal Mine Safety through an approved Solid Shooting Plan.

§45.2-722.

The Use of Permissible Explosives

1. Q. What creates the force when an explosive is fired?
   A. The rapid release of heat and large quantities of high-pressure gases which expand rapidly.

Dictionary of Mining Terms

2. Q. How must deteriorated or damaged explosives and blasting caps be disposed of?
   A. In accordance with the manufacturer's recommendations.

30 CFR §75.1328

3. Q. What material shall the outside of explosive magazines be constructed?

A. Incombustible material.

§45.2-719.

4. Q. What shall be posted near explosive magazines?
   A. Suitable warning signs. They shall be located so that a bullet going directly through the sign will not strike the magazine.

§45.2-719.

5. Q. How shall permissible explosives be stored on the surface?
   A. In well-ventilated magazines.

§45.2-719.

6. Q. What is not allowed to accumulate in or around explosive magazines?
   A. Rubbish or any other combustible material.

§45.2-719.

7. Q. What method of lighting shall not be permitted in explosive magazines?
   A. Open lights.

§45.2-719.

8. Q. How close to a stove, furnace, open fire or flame can an explosive magazine be located?
   A. 20 feet

§45.2-719.

9. Q. For what distance in all directions shall the area surrounding surface magazines be kept free of rubbish, dry grass or other materials of a combustible nature?
   A. 25 feet.

§45.2-719.G.

10. Q. If surface conditions permit, how far shall magazines be located from any mine opening, occupied building, or public road?
    A. No less than 300 feet unless otherwise approved by the Chief.

§45.2-719.E.

11. Q. How shall explosives and detonators be carried into an underground mine?
    A. In individual, nonconductive containers maintained in good condition and kept closed.

§45.2-720.A.

12. Q. How may explosives be hauled by electrically powered equipment?
    A. In substantially covered cars lined with nonconductive material, or in special, substantially built, covered containers lined with nonconductive material.

§45.2-720.B.4.

13. Q. Are explosives allowed to be transported on the same mantrip with workers?
    A. No, explosives are prohibited on trips that transport workers.

§45.2-720.B.5.

14. Q. How close to a man-trip may an explosive-trip be operated?
    A. Not closer than five minutes apart.

§45.2-720.B.5.

15. Q. In what direction should the air travel in relation to a man-trip and an explosive trip?
    A. From the man-trip toward the explosive trip.

§45.2-720.B.5.

16. Q. What quantity of explosives may be stored in underground magazines?
    A. No more than a 48-hour supply.

§45.2-721.B

17. Q. How should explosives and detonators be kept near the face?
    A. In individual closed containers not less than twelve feet apart, fifty feet from the face and out of the line of blast.

§45.2-721.C.

18. Q. How far away from roadways and power wires shall underground magazines be located?
    A. 25 feet.

§45.2-721.A.

19. Q. What type of stemming material is used to confine explosives in boreholes?
    A. Incombustible material such as clay or other stemming devices approved by the Chief..

§45.2-722.

20. Q. What type of tools should be used to open containers of explosives and detonators?
    A. Nonmetallic tools.

§45.2-722.

21. Q. What is the only type of explosives that can be used in a coal mine?
    A. Permissible explosives.

§45.2-722.

22. Q. What shall be the length of holes drilled for explosives in relation to the cut?

A. No deeper than the length of the cut.

§45.2-722.

23. Q. How should warnings be given before shots are fired?
    A. By shouting **"FIRE"** at least three times slowly after those notified have withdrawn and before the shot is fired.

§45.2-722.

24. Q. What should persons do when notified before shots are fired?
    A. Withdraw from the shot area immediately.

§45.2-722.

25. Q. Where should persons be located when shots are fired?
    A. In a safe location, at least 100 feet away.

§45.2-722.

26. Q. When may a person approach an area after a shot has been fired?
    A. When the smoke and fumes have cleared.

§45.2-722.

27. Q. How can misfires be prevented?
    A. By proper methods of preparing primers, priming, loading, stemming, and firing.

§45.2-722.

28. Q. Who shall be designated to fire shots underground?
    A. A Certified Shot Firer.

§45.2-722.

29. Q. How shall boreholes be prepared for the loading of explosives?
    A. Boreholes shall be cleaned.

§45.2-722.

30. Q. How shall explosives be confined in boreholes?
    A. They shall be confined with incombustible material.

§45.2-722.

31. Q. What test is required before shots can be fired?
    A. The place shall be examined for explosive gas immediately before firing.

§45.2-722.

32. Q. What type of tamping instrument shall be used?
    A. Only nonmetallic tamping bars.

§45.2-722.

33. Q. What shall be done before work can resume after a shot has been fired?
    A. The roof shall be examined and the area made safe.

§45.2-722.

34. Q. Who must be warned before shots are fired?
    A. All persons in the working place and others who may be affected by the shot.

§45.2-722.

35. Q. How many types of explosives may be used in the same borehole?
    A. Only one type.

§45.2-722.

36. Q. What type of shots shall not be fired in any mine unless otherwise approved by the Chief?
    A. Adobe, mudcapping or any other unconfined shot.

§45.2-722.

37. Q. May electrical equipment be operated in the face or immediate work area while boreholes are being charged with explosives?
    A. No.

§45.2-722.

38. Q. What type of scraper is allowed on tamping bars?
    A. A nonsparking metallic scraper.

§45.2-722.

39. Q. What burden shall all blasting charges have?
    A. At least 18 inches in all directions if the height of the coal permits.

§45.2-722.

40. Q. What method of removing misfires is not permitted?
    A. Drilling into misfired explosives.

§45.2-724.

41. Q. What is the first thing to do when a misfire has occurred?
    A. Disconnect the battery end wires from the blasting unit and short-circuit the wires by twisting them together.

§45.2-724.

42. Q. How shall a misfire be removed?
    A. Another hole may be drilled at least 24 inches away and fired; or the stemming and charge may be washed from the borehole with water; or a new primer may be inserted and fired after the stemming has been washed out.

§45.2-724.

43. Q. Who shall supervise the removal of misfires?
    A. The mine foreman or a certified competent person designated by him.

§45.2-724.

Firing Devices

1. Q. What is a shunt?
   A. It is made by connecting the ends of leg wires.

Dictionary of Mining Terms

2. Q. What is a primer?
   A. An explosive cartridge with a blasting cap inserted.

Dictionary of Mining Terms

3. Q. How should the leg wires be connected when shooting coal?
   A. In series.

Dictionary of Mining Terms

4. Q. How are electric detonators and blasting circuits tested?
   A. With a blaster's multimeter or galvonmeter.

Dictionary of Mining Terms

5. Q. What instrument should never be used to test electric detonators or any part of an electric blasting circuit?
   A. Never use a standard volt-ohm meter to test detonators or any part of an electric blasting circuit.

30 CFR §78.1318

6. Q. How should the blasting cap be inserted in a primer?
   A. By inserting the full length of the cap into the end so that the loaded end is on the axial line.

30 CFR §78.1318

7. Q. Where should the blasting cap be placed when a borehole is charged?

A. It should be placed centrally in the primer and pointed toward the body of the charge.

30 CFR §78.1318

8. Q. May instantaneous or zero-delay detonators be fired in the same circuit as millisecond-delay detonators?
   A. No.

30 CFR §78.1320 (b)

9. Q. After the first shot or shots, what is the maximum and minimum interval between the designated delay periods of successive shots?
   A. At least 50 milliseconds but not more than 100 milliseconds, unless otherwise approved by the Chief.

30 CFR §75.1320 (1)(ii)

10. Q. When and to whom should misfires be reported?
    A. Immediately to the mine foreman and other mine officials.

30 CFR §75.1327 (b)(2)

11. Q. What is the maximum time delay in an entire round of shots when millisecond delay detonators are used?
    A. Not more than 1,000 milliseconds.

30 CFR §75.1320 (c)

12. Q. How is an electric blasting cap protected from stray current flowing through the leg wires?
    A. By means of a shunt.

§45.2-722.B.14.

13. Q. For maximum protection, when should the shunt be removed from an electric blasting cap?
    A. When connecting the blasting cap leg wires into the blasting circuit.

§45.2-722.

14. Q. When should blasting caps be placed in explosives?
    A. When the holes are ready to be charged.

§45.2-722.

15. Q. Who should connect and handle the shooting cable?
    A. The shot firer who will detonate the shot.

§45.2-722.

16. Q. Why should shots not be fired from the trolley wire?

A. Arcs may be created that will ignite gas or coal dust.

§45.2-722.

17. Q. What is a proper blasting cable?
    A. A well-insulated cable of adequate size and length.

§45.2-723.

18. Q. How may shooting cables be protected from stray current?
    A. By being properly insulated and kept away from other power circuits.

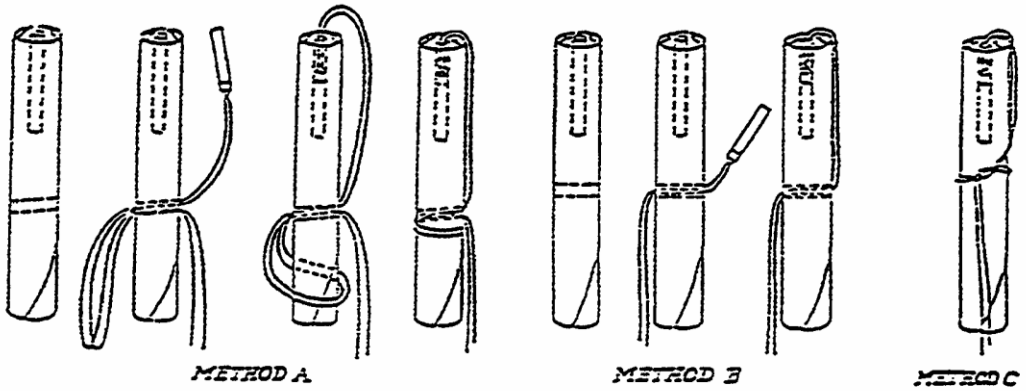
§45.2-723.

19. Q. How should shooting cables be maintained?
    A. Properly insulated and kept shunted until immediately before connecting to the firing unit.

§45.2-723.

20. Q. What precaution should be observed during unwinding of the shot-firing cable?
    A. Care should be taken to keep it from contacting rail, wire, pipe, or other electrical circuits, which may carry stray current.

§45.2-723.



METHODS OF PREPARING PRIMERS FOR BLASTING

SECTION 12 – MINE EXAMINATIONS – PRE-SHIFT, ON-SHIFT AND WEEKLY

Mine foreman assigned to conduct Pre-shift, On-shift, weekly, and supplemental examinations are responsible for identifying, initiating corrective action and recording hazardous conditions as well as violations of MSHA Mandatory Safety and Health Standards in applicable record books.

Mandatory Safety and Health Standards (MSHA—Effective August 6, 2012

1. 30 CFR §75.202(a)---------- Protection From Falls of Roof, Face, and Ribs
2. 30 CFR §75.220(a)(1)----------Roof Control Plan
3. 30 CFR §75.333(h)----------Ventilation Controls
4. 30 CFR §75.370(a)(1)----------Ventilation Plan-Methane and Respirable Dust
5. 30 CFR §75.400----------Accumulation of Combustible Materials
6. 30 CFR §75.403----------Application of Rock Dust
7. 30 CFR §75.1403----------Other Safeguards—Limited to maintenance of travel ways along belt conveyors, off track haulage roadways, track haulage, track switches, and other haulage components.
8. 30 CFR §75.1722(a)----------Guarding Moving Machine Parts
9. 30 CFR §75.1731(a)----------Maintenance of Belt Conveyor Components

Mine examinations are a vital necessity to preserve the health and safety of all personnel that go underground. The record keeping associated with such examinations are equally as important as the examinations themselves. The records are necessary to verify that these mine examinations have been conducted.

Workplace examinations are an accepted safety practice in the mining industry and are required by law. These examinations are the primary means of determining the effectiveness of the mine ventilation system and detect hazards such as methane accumulations. The purpose of Pre-shift and On-shift examinations are to timely identify hazardous conditions and violations which may affect miner's safety during the shift. Hazards found during Pre-shift examinations will be identified for corrective action and "dangered off" to prevent injury to miners. Hazards that may develop in the constantly changing environment of a producing section or a section where equipment is being installed or removed will be identified during the On-shift examination and corrective action will be initiated immediately. Corrective action for hazards "dangered off" during the Pre-shift examination will be shown on the On-shift report.

The purpose of a weekly examination is to: (1) Identify, correct, and record hazardous conditions and violations. (2) Insure that the ventilation system is effective and operating properly.(3) Insure that mine travel ways, haulage ways, and escapeways are maintained in safe condition.

Hazardous Conditions

For the purpose of workplace examinations, hazards are considered to be conditions that are likely to cause death or bodily injury to persons exposed to such conditions. Hazardous conditions are violations of mandatory standards as well. The examiner should identify and or initiate corrective action for all hazardous conditions and violations observed.

Below is a list of examples of hazardous conditions. These examples ore not intended to be all inclusive:

- Loose roof, overhanging brows, ribs that need to be taken down or supported
- Smoldering fires and latent fire sources
- Excessive levels of methane
- Oxygen deficiency levels below 19.5%
- Substantial unintentional ventilation changes from previous examinations
- Ventilation short circuits
- Ineffective bleeder system
- Water accumulations that need pumping
- Explosives and or detonators left out of magazines
- Open or damaged explosive magazines
- Damaged or improperly installed ventilation controls on the section
- Dangerous accumulations of loose coal or coal dust
- Rock dust not applied in required quantities
- Fire hazards from damaged or improperly operating belt conveyors
- Belt conveyor friction hazards----rubbing timbers, belt drive components, etc.
- Broken rails or other damaged track conditions that could cause man trip or haulage trip wrecks
- Obstructions in clearance along man trip and haulage roads
- Blocked escape ways or travel ways or areas in escape ways or travel ways that need additional roof support or where pumping is needed
- Air courses or clearances along belts where travel is blocked or areas where additional roof support or pumping is needed
- Equipment parked near haul through check curtains
- Inadequate installation of line curtains
- Energized face equipment or operating auxiliary fans when no one is present on the section
- Damaged airlock doors or other ventilation controls
- Damaged seals
- Slip and fall hazards
- Equipment guards that have been removed and not replaced
- Damaged equipment

PRE-SHIFT EXAMINATIONS
Coal Mine Safety Laws of Virginia
§45.2-826.

The operator or his agent shall establish eight (8) hour intervals of time for required Pre-shift examinations. Within three (3) hours preceding the beginning of any such eight hour interval during which any person is scheduled to work or travel underground, the mine foreman shall make a Pre-shift examination. No person shall enter a mine except the mine foreman conducting the examination unless a Pre-shift examination has been completed for such established eight hour interval.

A certified person (mine foreman) shall supervise the correction of conditions that create an Imminent Danger. Any imminent danger that cannot be removed within a reasonable time shall be reported to the Chief by the quickest available means.

Within three (3) hours preceding the beginning of any eight (8) interval, a mine foreman shall examine for hazardous conditions, test for methane and oxygen deficiency, and determine whether the air is of sufficient volume as well as traveling in its regular course in each split in the following underground locations:

1. Track entries and other areas where persons are scheduled to work or travel
2. Belt conveyor entries and belt conveyors used to transport persons
3. Working sections and areas where mechanized equipment is being installed or removed.
4. Working places, approaches to worked out areas and ventilation controls on sections
5. Approaches to worked out areas along intake air courses where that air is used to ventilate a working section
6. Seals along intake entries where air used to ventilate the seal is used to ventilate the working section
7. Entries and rooms driven off intake entries more than 20 feet without a crosscut or more than 2 crosscuts without permanent ventilation controls installed
8. Unattended diesel equipment that is intended to operate during the shift.

Volume of air entering each of these areas:

1. Last open crosscut for each working section
2. Last open crosscut where equipment is being installed or removed
3. Intake entries immediately out by the face of long wall
4. Intake end of pillar line

- Velocity of air at each end of face of long wall at locations specified in the approved ventilation plan required by MSHA
- At each working place examined, the mine foreman (examiner) shall certify by initials, date and time that the examination was conducted.
- Areas outby, the mine foreman (examiner) shall certify by initials, date and time at enough locations to show entire area has been examined
- Idle and worked out areas shall be inspected for methane and other hazardous conditions immediately before miners enter or work in such areas.
- Pre-shift examinations of surface areas of underground mines shall be made in accordance with §45.2-903.
- Certified persons may be used to make Pre-shift examinations in multiple shift operations
- Hazardous conditions that are found and not corrected shall be posted with conspicuous danger sign(s) and only persons designated by the operator or his agent to correct or evaluate the condition may enter the posted area(s).
- Mine foreman may place a signal at the entrance of the mine to verify a Pre-shift examination has been conducted and the mine is clear of danger.
- Once the Pre-shift examination is completed, the mine foreman (examiner) shall return to the surface of a designated station underground to report to an authorized person on the surface before other miners enter the mine. No person other than the mine foreman (examiner) may enter the mine until the examination has been completed and the mine reported to be clear of danger. However, miners may enter the mine under the direction of a mine foreman for the purpose of making the mine safe.
- If a Pre-shift report is recorded by a person other than the examiner, then the examiner shall verify the record with his initials and date upon arrival on the surface.
- A Pre-shift examiner while in the performance of his duties in conducting an examination shall have no superior officer and all miners shall be subordinate to him or her.

§45.2-501. - Hazardous Condition

"Hazardous condition" means conditions that are likely to cause death or serious personal injury to persons exposed to such conditions.

§45.2-715. – Examination and Testing of Roof, Face, and Ribs

Any place in which a hazardous condition is found by the mine foreman (examiner) shall be made safe in his presence or under his direction or the miners shall be withdrawn from such place.

§45.2-830. - Record of Examination

- A mine foreman or other certified person conducting a required examination shall record the results of the examination in ink or indelible pencil in a book kept on the surface for that purpose.

- Any hazardous condition found by the mine foreman or other certified person designated to conduct examinations shall be corrected immediately or the affected area shall be dangered off until the condition is corrected. If the hazardous condition creates an **Imminent Danger**, then all persons shall be withdrawn except those required to perform work to correct the imminent danger.

- Record of hazardous conditions found and corrective action taken shall be made by the completion of the end of the shift on which the hazardous condition is found.

- The supervisor of the examiner(s) shall read and countersign the daily records of certified persons. The mine operator may authorize another person with equivalent authority of the examiner's supervisor to read and countersign during a temporary absence of examiner's supervisor.

- Person countersigning mine examination records shall insure that actions to eliminate or control hazardous conditions have been taken. The record shall be countersigned no later than the end of the next regularly scheduled shift following the shift for which the examination records were completed. Records that do not disclose a hazardous condition may be countersigned within 24 hours following the end of the shift for which the examination records were completed.

- The Mine Foreman (examiner) shall enter a record of any condition in the mine which states clearly the location and nature of any hazardous condition and what corrective action was taken.

- The actual level of methane detected in any examination shall be recorded.

§45.2-831.—Notice of Hazardous Conditions

- Mine foreman shall give prompt attention to eliminate or control all hazardous conditions

reported to him by any person working in the mine. If a hazardous condition is impracticable to remove, then all persons whose safety is affected shall be notified to remain away from the hazardous condition (affected area)

PRE-SHIFT EXAMINATIONS
Code of Federal Regulations Part 30
§75.360

2021 Revisions include 2008 and 2012 MSHA Law Changes

- A certified person designated by the operator shall examine within three (3) hours preceding the beginning of any eight (8) hour interval during which any person is scheduled to work or travel underground. The operator must establish eight (8) hour intervals of time subject to required Pre-shift examinations.

- Pumpers who are certified shall conduct a Pre-shift examination prior to performing any work.

- Mandatory Safety and Health Standards (MSHA) Effective August 6, 2012

  1. 30 CFR §75.202(a)---------- Protection From Falls of Roof, Face, and Ribs
  2. 30 CFR §75.220(a)(1)----------Roof Control Plan
  3. 30 CFR §75.333(h)----------Ventilation Controls
  4. 30 CFR §75.370(a)(1)----------Ventilation Plan-Methane and Respirable Dust
  5. 30 CFR §75.400----------Accumulation of Combustible Materials
  6. 30 CFR §75.403----------Application of Rock Dust
  7. 30 CFR §75.1403---------- --Other Safeguards—Limited to maintenance of travel ways along belt conveyors, off track haulage roadways, track haulage, track switches, and other haulage components.
  8. 30 CFR §75.1722(a)----------Guarding Moving Machine Parts
  9. 30 CFR §75.1731(a)----------Maintenance of Belt Conveyor Components

Any Person conducting a Pre-shift examination shall:

(1) Examine for hazardous conditions and violations of the nine (9) MSHA Mandatory Safety and Health Standards.

(2) Test for Methane and Oxygen deficiency.

(3) Determine if air is moving the in the proper direction in the following locations:

- Roadways, travel ways, track haulage ways and areas where persons are scheduled to work or travel during the oncoming shift

- Belt conveyors used to transport persons and the entries in which these belt conveyors are located and entries with operating belt conveyors

- Working sections and areas where mechanized equipment is being installed or removed, if anyone is scheduled to work on the section or area during the oncoming shift. The exam shall also include ventilation controls and test of roof, face and ribs as well as approaches to worked out areas

- Approaches to worked out areas along intake air courses

- Seals along intake if air ventilates working sections

- Entries and rooms driven off intake entries more than 20 feet without a crosscut or 2 crosscuts without permanent ventilation controls installed where intake air passes through or by these entries.

- High spots along intake air courses where methane is likely to accumulate, if equipment will be operated in the area during the shift

- Underground electrical installations (transformer stations, battery charging stations, substation rectifiers, pumps) if this equipment will be energized during the shift.

- Other areas where work or travel during the oncoming shift is scheduled prior to the beginning of the shift.

- A person conducting a Pre-shift examination shall check Refuge Alternative(s)for (1) Damage (2) Integrity of the tamper evident seal (3) Mechanisms required to deploy the refuge alternative(s) (4) Ready availability of compressed oxygen and air.

Requires Pre-shift Examiner to Measure Volume of Air in the following locations:

- Last open crosscut for each working section

- Last open crosscut where equipment is being installed or removed

- Intake entries immediately out by face of long wall/short wall

- Intake of any pillar line

Requires velocity near each end of face on longwalls and shortwalls

Certification

- At each working place examined, the certified examiner shall certify by initials, date and time that the examination was completed.

- Areas outby, the certified examiner shall certify by initials, date and time at enough locations to show entire area has been examined

Records

- Record may be made by certified examiner or person designated by operator. If record is made by someone other than the examiner, then the examiner shall verify the record by initials and date by or at the end of the shift. A record shall be made by a certified person of the action taken to correct hazardous conditions and violations of the nine (9) MSHA Mandatory Safety or Health Standards.

- The results of methane tests shall be recorded as the actual percentage of methane measured by the examiner

- Record to be countersigned by mine foreman or equivalent mine official by the end of that person's next regularly scheduled working shift

- Examination records made in a secure book and shall be retained at the mine for one (1) year.

Supplemental Examination

- A certified person (mine foreman) shall: (1) examine for hazardous conditions and violations of Mandatory Safety or Health Standards (2) Determine that air is traveling the proper direction and normal volume (3) Test for methane and oxygen deficiency.

- Supplemental examinations are required for any area of the mine where persons enter and a Pre-shift examination has not previously been conducted.

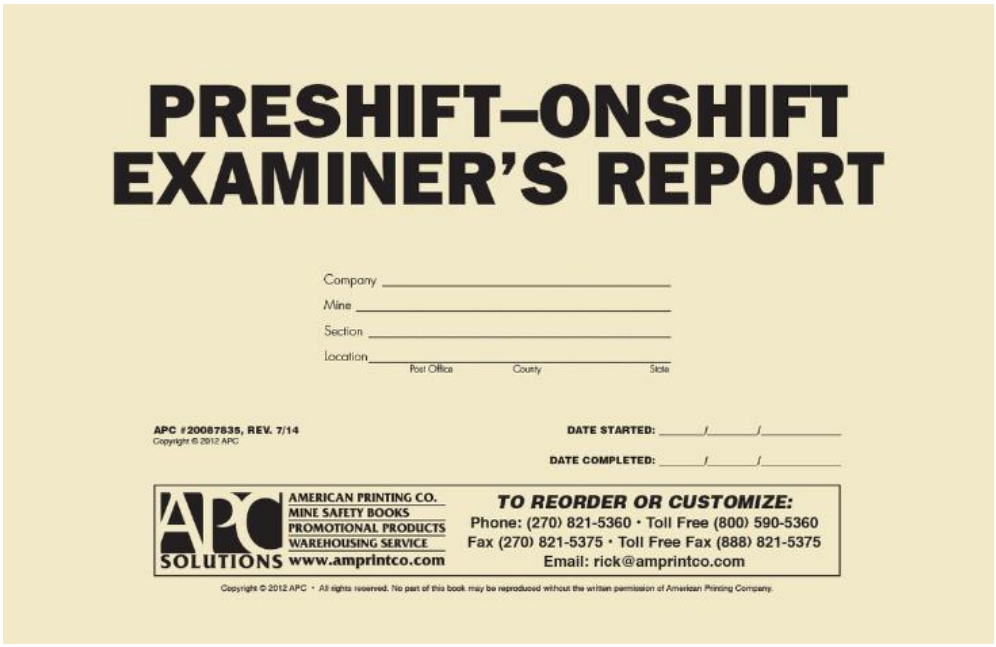
- Mine examination must be conducted by a certified person (mine foreman).

30 CFR §75.363

- A certified person (mine foreman) shall place initials, date, and time at each working place examined. For out by locations, a certified person (mine foreman) shall certify with initials, date, and time at enough locations to show the entire area has been examined.

- During any required examination, hazardous conditions shall be posted with a conspicuous danger sign and area shall remain posted until hazardous conditions are corrected.

- Mine operators shall review with mine examiners on a quarterly basis any citations and orders issued in areas where Pre-shift, supplemental, On-shift, and Weekly mine examinations are required.



PRESHIFT–ONSHIFT EXAMINER'S REPORT

Company _____

Mine _____

Section _____

Location _____
Post Office County State

APC #20087835, REV. 7/14

DATE STARTED: ____/____/____

DATE COMPLETED: ____/____/____

Use Indelible Pencil or Ink **PRE-SHIFT-CERTIFIED EXAMINER'S REPORT** Report Shall be Signed When Made

Pre-shift required within 3 hours prior to any 8 hour interval

Date of Examination: _____ Time From::_____ AM PM To _____ AM PM

Section/Area: _____ Reported Outside Yes No Time:_____ AM PM

Reported By:_____ Received By (INITIAL) _____

Report of examinations, Hazardous conditions, and violations of Health/Safety Standards

Location	Results of Examination and Violations	Action Taken	% CH_4
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			

Identify, record, and correct violations of Safety and Health standards with special emphasis on violations involving roof support, roof control plan, ventilation/methane, accumulations of combustible materials, rock dust, travel ways along belts, haulage roadways, track haulage roadways, guarding, and maintenance of belt conveyor components

Air Measurements

Location	CFM	Location	CFM

LOCC * Longwall Intake Entry(ies) * Intake End Pillar Line * LOCC (Where Equipment Being Installed or Removed)

Velocities: Longwall Head_____ Longwall Tail_____

Remarks:_____
_____
_____
_____
_____
_____

Report of Hazardous Conditions Encountered

Location	Hazardous Condition	Action Taken
1.		
2.		
3.		
4.		
5.		
6.		

_____ _____ _____
Signed by Pre-shift Examiner Date Certification number

_____ _____ _____
Countersigned by Examiner's Supervisor Date Certification number

_____ _____
Countersigned by operator / Agent Date

This Record to be retained for one year

Hazardous Conditions

Additional Page to record Hazardous Conditions

Location	Hazardous Conditions	Action Taken	% CH_4
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			

PRE-SHIFT-CERTIFIED EXAMINER'S REPORT
PRE-SHIFT EXAMINATION PRACTICE EXERCISE

You are the day shift foreman (VA certification # 01234) and are conducting a Pre-shift examination of the section. Mark areas on the map where you would take oxygen and/or methane readings with an **X** and where you would make ventilation readings with a **V**. Mark locations where you would make the date, time, and initials with a **D**. You have also observed the following conditions. Mark each box that is a hazardous condition with an **H**. Mark each block that is a violation with a **V.** Hazardous condition means conditions that are likely to cause death or serious personal injury to persons exposed to such conditions. A violations means a violation of the Mandatory Safety and Health Act.

☐ Rock dust applied to within 20 feet of the face in No. 2 Entry.

☐ Coal spillage approximately 24" in depth has accumulated on both sides of the Feeder and extends out by on the section beltline for a distance of 25 feet.

☐ The line curtain in the No. 2 Entry has fallen down and 1.2% of methane detected in the face area.

☐ Pump located 2 crosscuts outby the face of No. 4 Entry is hot and smoking and has exposed electrical conductor in the cable.

☐ Water has accumulated 3" to 6" deep in roadway dip 2 breaks outby the face of No. 4 Entry.

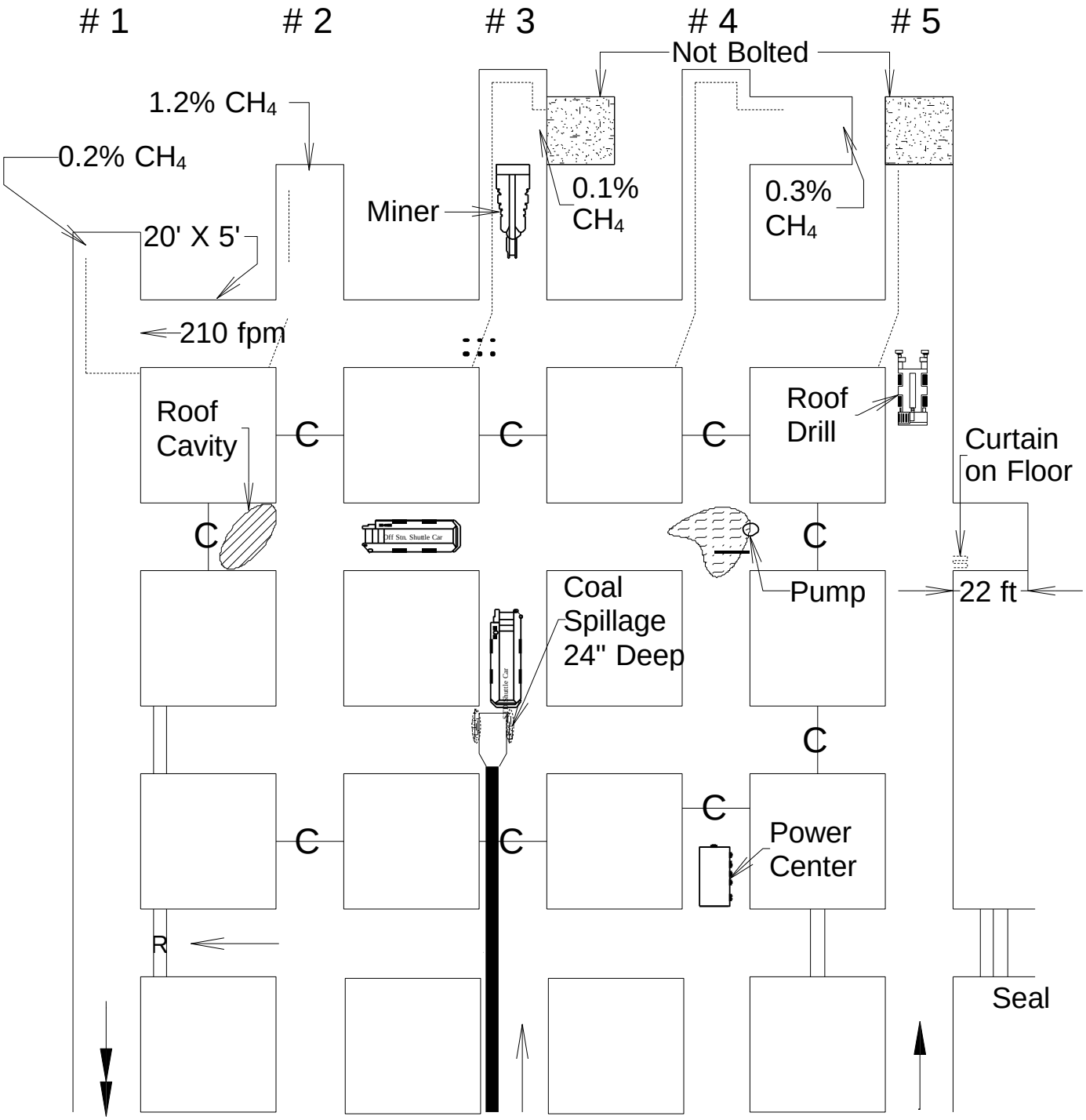
☐ One break outby the face of the No. 3 entry, the heads of mechanical roof bolts have been sheared off by shuttle cars for a distance of 16 feet (6 bolt heads sheared off).

☐ The off standard shuttle car was left loaded with coal.

☐ Electrical power on the roof bolter and two shuttle car trailing cables had been left energized by the previous shift.

The date is January 28, 2020 and you conducted the Pre-shift examination from 2:00 PM through 3:15 PM. You call the results outside at 3:20 PM and the report is recorded by Jim Smith.

Instructions: As the Mine Foreman you must examine for hazardous conditions, test for methane and oxygen deficiency, and determine whether the air is traveling in its proper course and is of sufficient volume in each split. Taking into consideration all of the findings of your examination, complete the attached Pre-shift examination record in accordance with Virginia and MSHA requirements.



West Mains 003 Section

X – Oxygen/Methane Reading

V – Ventilation Reading

D – Date, Time, Initials

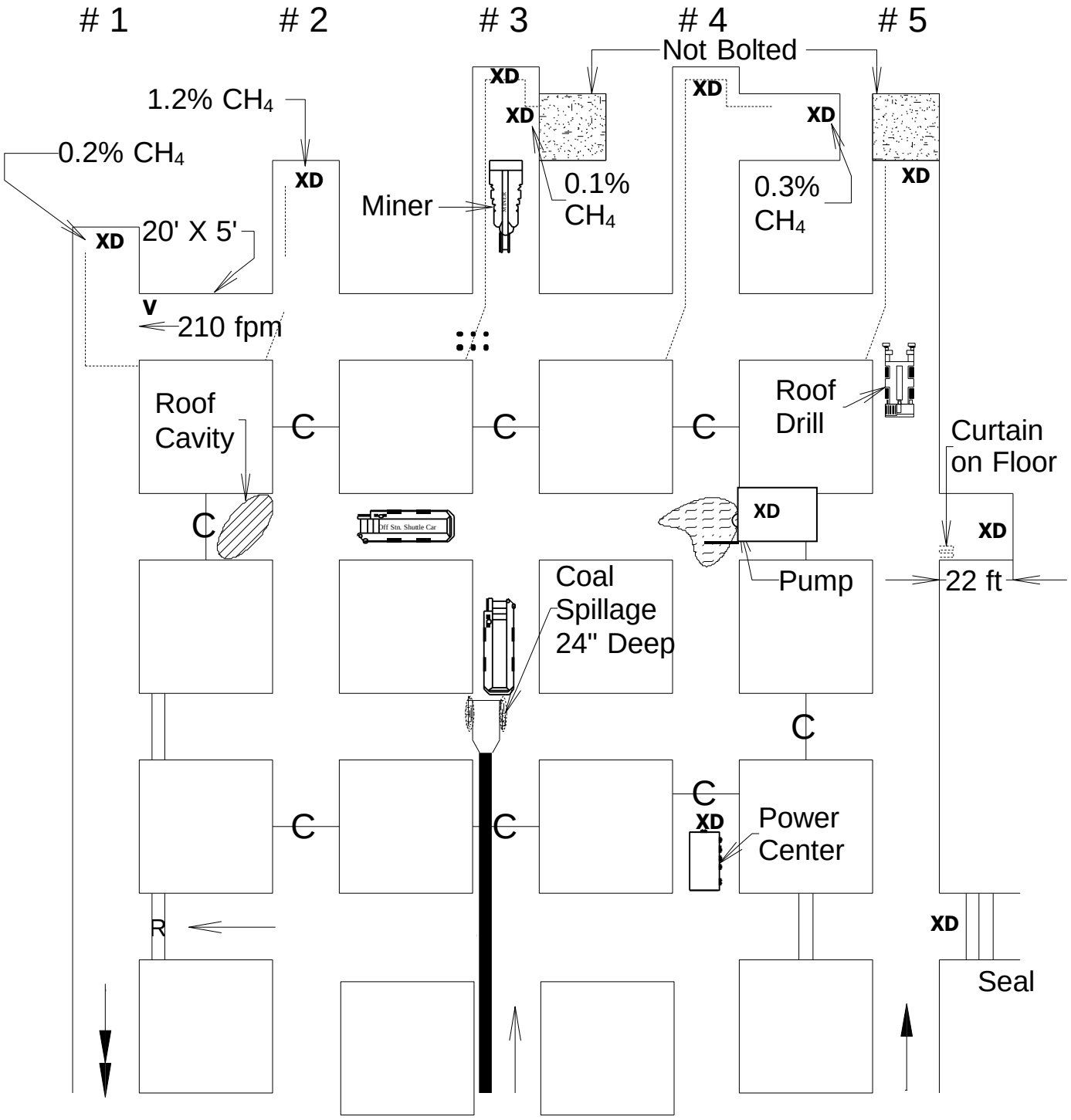
VIRGINIA UNDERGROUND MINE FOREMAN PRE-SHIFT EXAMINATION PRACTICE EXERCISE

You are the day shift foreman (VA certification # 01234) and are conducting a Pre-shift examination of the section. Mark areas on the map where you would take oxygen and/or methane readings with an **X** and where you would make ventilation readings with a **V**. Mark locations where you would mark the date, time, and initials with a **D**. You have also observed the following conditions. Check each box that is a hazardous condition with an **H** and each violation with a **V.** Hazardous condition means conditions that are likely to cause death or serious personal injury to persons exposed to such conditions and a violation is a violation of the Mandatory Safety and Health Act,

	Rock dust applied to within 20 feet of the face in No. 2 Entry.
V	Coal spillage approximately 24" in depth has accumulated on both sides of the feeder.
H	The line curtain in the No. 2 Entry has fallen down and 1.2% of methane detected in the face area.
H	Pump located 2 crosscuts outby the face of No. 4 Entry is hot and smoking and has exposed electrical conductor in the cable.
V	Water has accumulated 3" to 6" deep in roadway dip 2 breaks outby the face of No. 4 Entry.
H	One break outby the face of the No. 3 entry, the heads of mechanical roof bolts have been sheared off by shuttle cars for a distance of 16 feet (6 bolt heads sheared off).
	The off standard shuttle car was left loaded with coal.
V	Electrical power on the roof bolter and two shuttle car trailing cables had been left energized by previous shift.

The date is January 28, 2020 and you conducted the Pre-shift examination from 2:00 PM through 3:15 PM. You call the results outside at 3:20 PM and the report is recorded by Jim Smith.

Instructions: As the Mine Foreman you must: (1) Examine for hazardous conditions. (2) Test for methane and oxygen deficiency, (3) Determine whether the air is traveling in its proper course and is of sufficient volume in each split. Taking into consideration all of the findings of your examination, complete the attached Pre-shift examination record in accordance with Virginia and MSHA requirements.



West Mains 003 Section

X – Oxygen/Methane Reading

V – Ventilation Reading

D – Date, Time, Initials

Use Indelible Pencil or Ink

PRE-SHIFT-CERTIFIED EXAMINER'S REPORT

Report Shall be Signed When Made

Pre-shift required within 3 hours prior to any 8-hour interval

Date of Examination: **January 28, 2020**

Time From:: **2:00** AM PM To: **3:15** AM PM

Section/Area: Section/Area: **West Mains - 003**

Reported Outside? Yes **X** No ____ Time: **3:20** AM PM

Reported By: **John Jones**

Received By: (INITIAL) **JS**

Report of Examination, Hazardous Conditions and Violations of Health/Safety

Location	Results of Examination and Violations	Action Taken	% CH4
1. **#1**	**None**		**0.2%**
2. **#2**			**0.6%**
3. **#3**	**Coal Spillage 24 inches in depth Feeder extending 25 feet on belt conveyor**	**Reported-**	**0.0%**
4. **#3 Right**	**None**		**0.1%**
5. **#4**	**Water in dip 6 inches in depth**	**Reported**	**0.0%**
6. **#4 Right**	**None**		**0.3%**
7. **#5**	**None**		
8. **.Section Power Center**	**Roof bolter and 2 Shuttle car cables energized**	**De-energized cables**	
9.			
10.			
11.			

Identify, record, and correct violations of health and safety standards with special emphasis on violations involving roof support, roof control plan, ventilation/methane, accumulations of combustible materials, rock dust, travel ways along belts, haulage roadways, track haulage roadways, guarding, and maintenance of belt conveyor components

THIS RECORD TO BE RETAINED FOR ONE (1) YEAR

Air Measurements

Location	CFM	Location	CFM
LOCC #1 #2	**21,000**		

LOCC * Longwall Intake Entry(ies) * Intake End Pillar Line * LOCC Where Equipment Being Installed or Removed

Velocities

Longwall Headgate: _____ Longwall Tailgate: _____

Remarks: Examined seal off intake (#5 Entry) Ch_4—0.0% O_2--20.3%

Report of Hazardous Conditions Encountered

	Location	Hazardous Condition	Action Taken
1.	#2 Entry	Line curtain down—1.2% CH_4	Installed Curtain reduced to 0.6%
2.	#3 Entry	6 roof bolt heads sheared off for a distance of 28 feet	Dangered off the area
3.	#4 Entry 2 crosscuts outby face	A pump cable was observed to be hot and smoking also exposed	De-energized the power to the cable until it can be repaired
4.			
5.			
6.			

John Jones — Signed by Pre-shift Examiner; 1/28/20 — Date; 01234 — Certification number

David Jones — Countersigned by Examiner's Supervisor; 01/28/20 — Date; 12345 — Certification number

Bill Smith — (Countersigned by Operator / Agent); 01/28/20

This Record to be retained for one year

ON SHIFT EXAMINATIONS
Coal Mine Safety Laws of Virginia
§45.2-827.

2021 Revisions include 2005 Law Changes

- Once each shift and more often if necessary a certified person shall: (1) Examine for hazardous conditions. (2) Test for methane and oxygen deficiency, (3) Determine if air is traveling in its regular course and sufficient volume in each split.

- Hazardous conditions shall be corrected immediately or the affected area shall be dangered off until the condition is corrected. If the hazardous condition creates an Imminent Danger then everyone except those persons necessary to correct the condition shall be withdrawn until the condition is corrected. Any imminent Danger that cannot be removed within a reasonable time shall be reported to the Chief by the quickest available means.

Required on section where coal is being produced or other areas where mechanized mining equipment is being installed or removed.

Required along each operating belt conveyor entry, when coal is produced and certify with time, date, and initials at enough locations to show the entire area has been examined.

- Determine at the following locations the volume of air:

    - Last open crosscut on each working section
    - Last open crosscut where equipment is being installed or removed Intake entries out by face of long wall
    - Intake end of pillar line

- Velocity of air at each end of face of long wall at locations specified in the approved ventilation plan required by MSHA

- Methane tests conducted by a qualified person:

    - Before electric equipment is taken or operated inby LOCC or before applying power to machinery that remains at or near face
    - Every 20 minutes and more often if necessary while electric equipment is operated inby LOCC

- Required at idle or worked-out areas including section belts idle for 24 hours before miners enter

- Daily and On-shift examinations of surface areas of underground coal mines shall be conducted in accordance with §45.2-903.

§45.2-501. Hazardous Condition

Hazardous Condition—Conditions that are likely to cause death or serious personal injury to persons exposed to such conditions

§45.2-715. Examination and Testing of Roof, Face, and Ribs

Any place in which a hazardous condition is found by the mine foreman shall be made safe in his presence or under his direction or the miners shall be withdrawn from such place.

§45.2-814.(B) Functional Test of Methane Monitors

A functional check of methane monitors on electrical face equipment shall be conducted by the equipment operator in the presence of a mine foreman and recorded in the On-shift record book.

§45.2-830. Record of Examinations

A mine foreman or other certified person conducting a required examination shall record the results of tests of the examination in ink or indelible pencil in a book kept on the surface for that purpose

Any hazardous condition found by the mine foreman or other certified person designated by the operator to conduct examinations shall be corrected immediately or the affected area shall be dangered off until the conditions is corrected. If the hazardous condition creates an Imminent Danger, then all persons shall be withdrawn except those required to perform work to correct the Imminent Danger.

Record of hazardous conditions found and corrective action taken shall be made by the completion of the shift on which the hazardous condition is found.

Supervisor of examiner(s) shall read and countersign the daily records of certified persons. The mine operator may authorize another person with equivalent authority of the examiner's supervisor to read and countersign records during a temporary absence of the examiner's supervisor.

Person countersigning mine examination records shall insure that actions to eliminate or control hazardous conditions have been taken. Records that disclose hazardous conditions require countersigning no later than the end of the next regularly scheduled shift following the shift for which the examination records were completed. Records that do not disclose hazardous conditions may be countersigned within 24 hours following the end of the shift for which the examination records were completed.

Mine foreman shall enter a record of any hazardous condition in the mine which states clearly the location and nature of the condition and what corrective action was taken.

Record actual level (percentage) of methane detected in any examination.

§45.2-831.—Notice of Hazardous Conditions

Mine Foreman shall give prompt action to the removal of all hazardous conditions reported to him by any person working in the mine, If impracticable to remove a hazardous condition, then he shall notify every person to remain away from the hazardous condition area until corrected.

ON-SHIFT EXAMINATION
Code of Federal Regulations Part 30
§75.362

Once each shift and more often if necessary for safety, a certified person shall :

(1) examine for Hazardous Conditions and Violations of Mandatory Safety and Health Standards; **(2)** test for methane and oxygen deficiency; and **(3)** determine if air is moving in its proper direction.

Mandatory Safety and Health Standards (MSHA) - Effective August 6, 2012

(1) §75.202 (a)	Protection from falls of roof, face and ribs
(2) §75.220 (a) (1)	Roof Control Plan
(3) §75.333 (h)	Ventilation Controls
(4) §75.370 (a) (1)	Ventilation Plan - methane and respirable dust
(5) §75.400	Accumulation of combustible materials
(6) §75.403	Application of rock dust
(7) §75.1403	Other safeguards - limited to travel ways along belt conveyors; off-track haulage roadways, track switches, and other components for haulage
(8) §75.1722 (a)	Guarding moving machine parts
(9) §75.1731 (a)	Maintenance of belt conveyor components

Any person conducting an examination shall: **(1)** examine for Hazardous Conditions and Violations of the nine (9) Mandatory Safety and Health standards listed above; **(2)** test for methane and oxygen deficiency; and **(3)** determine if air is moving in the proper direction.

- Required on sections where anyone is assigned to work
- Required where mechanized mining equipment is being installed or removed
- Required along belt conveyor haulageways - on any shift when a belt conveyor is operated
- Requires person designated by operator to conduct compliance examination of dust control parameters; deficiencies in dust control shall be corrected before production begins or resumes; record results and corrective action taken to assure compliance as specified in the mine ventilation plan

Certified person shall measure volume of air at the following locations:

1. Last open crosscut for each working section
2. Last open crosscut where mechanized mining equipment is being installed or removed where anyone is scheduled to work during the shift
3. Intake entries immediately outby the face of Longwall(s); includes installing or removing Longwall equipment

4. Intake end of pillar line

- Requires On-shift certified examiner to determine velocity of air at each end of face on Longwalls at locations specified in the approved ventilation plan

Methane tests conducted by a qualified person:

- At each working place at the start of each shift
- Before electrical equipment is energized or taken into or operated in a working place
- At 20 minute intervals during the operation of equipment in working places - or more often if required in the ventilation plan
- Methane tests shall be made at the face, from under permanent roof support, using extendable probes
- Made at the shearer, plow, or cutting head of the longwall machine
- Requires methane test if mining has stopped for more than 20 minutes **Methane**

test made by a certified person:

- In each return split of air from each working section or long wall face where coal is being produced - every four (4) hours (Immediate Return)
- Allows the use of an AMS in lieu of four (4) hour return methane tests

Certification:

- Examiner (s) certify with initials, date and time along operating belt conveyor entries at enough locations to show that the entire area has been examined
- Certified person shall conduct an examination of respirable dust control parameters as specified in the approved mine ventilation plan and record the results and corrective action taken to assure compliance with respirable dust control parameters specified in the approved mine ventilation plan. Deficiencies in dust control parameters shall be corrected before production begins or resumes. This certified person shall certify compliance of dust control parameters with initials, date and time placed on a board maintained at the section loading point or similar location to verify dust parameters examination was conducted before starting production or resuming production, (if hot-seating). A certified person shall verify examination of dust control parameters by placing initials and date in a record book; this record (verification) of dust parameters examination shall be made no later than the end of the shift for which the examination was made.

§75.363 Hazardous Conditions and Violations of Mandatory Safety and Health Standards - Posting, Correcting and **Recording**

Any hazardous condition found by a mine foreman or equivalent mine official while conducting examinations under Subpart D (Ventilation) shall be posted with a conspicuous danger sign where anyone entering the area(s) would pass;

A hazardous condition shall be corrected immediately or the area shall remain posted until the hazardous condition is corrected;

Hazardous condition creating an "Imminent Danger" - everyone except those persons referred to in Section 104 (C) of the Act shall be withdrawn from the area affected to a safe area until the hazardous condition is corrected; only persons designated by the operator to correct or evaluate the hazardous condition may enter a posted area.

Any Violation of a Mandatory Safety and Health Standard found during a Pre-shift, supplementary, On-shift or Weekly examination shall be corrected and recorded.

Records

- Record shall be made of any Hazardous Condition and any Violation of the nine (9) Mandatory Safety and Health Standards found; the record shall be made by the completion of the shift on which the hazardous condition or violation of Safety Standards is found; the record shall include the nature and location of the Hazardous Condition or Violation and corrective action taken.

- Record not required for shifts when no hazardous conditions or violations are found.

- Record shall be made by certified person who conducted the examination or person designated by the operator; if the record is made by a person other than the certified person, then the certified person will verify the record w i t h initials and date by or at end of the shift for which examination was made in the record book.

- Records shall be countersigned by the mine foreman or equivalent mine official by the end of that person's next regularly scheduled working shift.

- Record required in a secure book and shall be retained for one (1) year.

- Mine operators shall review with Mine Examiners on a Quarterly Basis - Citations and Orders issued in areas where Pre-shift, Supplemental, On-shift, and Weekly examinations are required.

Use Indelible Pencil or Ink

ON-SHIFT CERTIFIED EXAMINER'S REPORT

Report Must be Signed When made

Section/Area: _____

Reported Outside: Yes ____ No ____ Time _____ AM/PM

Date: _____ **Shift:** _____

Received by _____
(Authorized Person) (Initials)

Report of Examination, Hazardous Conditions and Violations of Health/Safety Standards

Location	Results of Examination and Violations	Action Taken	% CH_4
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			

Identify, record and correct violations of health and safety standards with special emphasis on violations involving roof support, roof control plan, ventilation/methane, accumulations of combustible material, rock dust, travelways along belts, haulage roadways, track haulage roadways, guarding, and maintenance of belt conveyor components.

THIS RECORD TO BE RETAINED FOR ONE YEAR

AIR MEASUREMENTS			EXAMINATIONS FOR METHANE (NOT TO EXCEED 4 HOURS)		
Location	**CFM**		**Location**	**Time**	**% CH_4**
* LOCC * Pillar Intake	* Longwall Intake		* Immediate Returns		

Velocities: Longwall Headgate: _____ Longwall Tailgate: _____

Roof Bolt Checks:

No. of Bolts Tested: _____ No. of Bolts Torqued Above Range: _____ Below Range: _____

If majority of bolts tested in any working place falls outside approved torque range, state what action was taken: _____

Methane Monitor Functional Checks: _____

Remarks (Statement as to general conditions of mine or area of mine): _____

REPORT OF HAZARDOUS CONDITIONS ENCOUNTERED

Location	Hazardous Condition	Action Taken

_____ _____ _____

Signed by On-shift Examiner(s) Date Certification Number(s)

_____ _____ _____

Countersigned by Examiner's Supervisor Date Certification Number(s)

_____ _____

Countersigned by Operator/Agent Date

THIS RECORD TO BE RETAINED FOR ONE YEAR

ON-SHIFT EXAMINATION

Section/Area: _____ **Reported Outside: Yes** ____ **No** ____ **Time** _____ **AM/PM**

Date: _____ **Shift:** _____ **Received by** _____
(Authorized Person) (Initials)

HAZARDOUS CONDITIONS
Additional page for conditions evaluated and recorded as Hazardous Conditions

Report of Examination - Hazardous Conditions

Location	Hazardous Conditions	Action Taken	% CH_4
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			

THIS RECORD TO BE RETAINED FOR ONE YEAR

VIRGINIA UNDERGROUND MINE FOREMAN EXAM
ON-SHIFT EXAMINATION PRACTICE EXERCISE

You are the evening shift foreman (VA certification # 23456) and are conducting an On-shift examination of the section. Mark areas on the map where you would take oxygen and/or methane readings with an **X** and where you would make ventilation readings with a **V**. Mark locations where you would mark the date, time, and initials with a **D**. You have also observed the following conditions below. Mark each box that is a **Hazardous Condition** with an **H.** Mark each box that is a **Violation** with a **V.** Hazardous Conditions are conditions that are likely to cause death or serious personal injury to persons exposed to such conditions. Violations are violations of 30 CFR Part 75 - Mandatory Safety and Health Standards.

☐ Methane reading in the immediate return is 1.2%.

☐ Breaker timbers in crosscut between #1 and #2 set on timber butts.

☐ Two of eight breaker posts set in #3 entry have been dislodged as a result of immediate roof falling in the gob.

☐ The ribs in No. 2 and No. 3 entries are sloughing. Bolts in the area are 46" to 48" from the rib.

☐ The area from the section belt tail roller extending for a distance of 300 feet needs rock dusting.

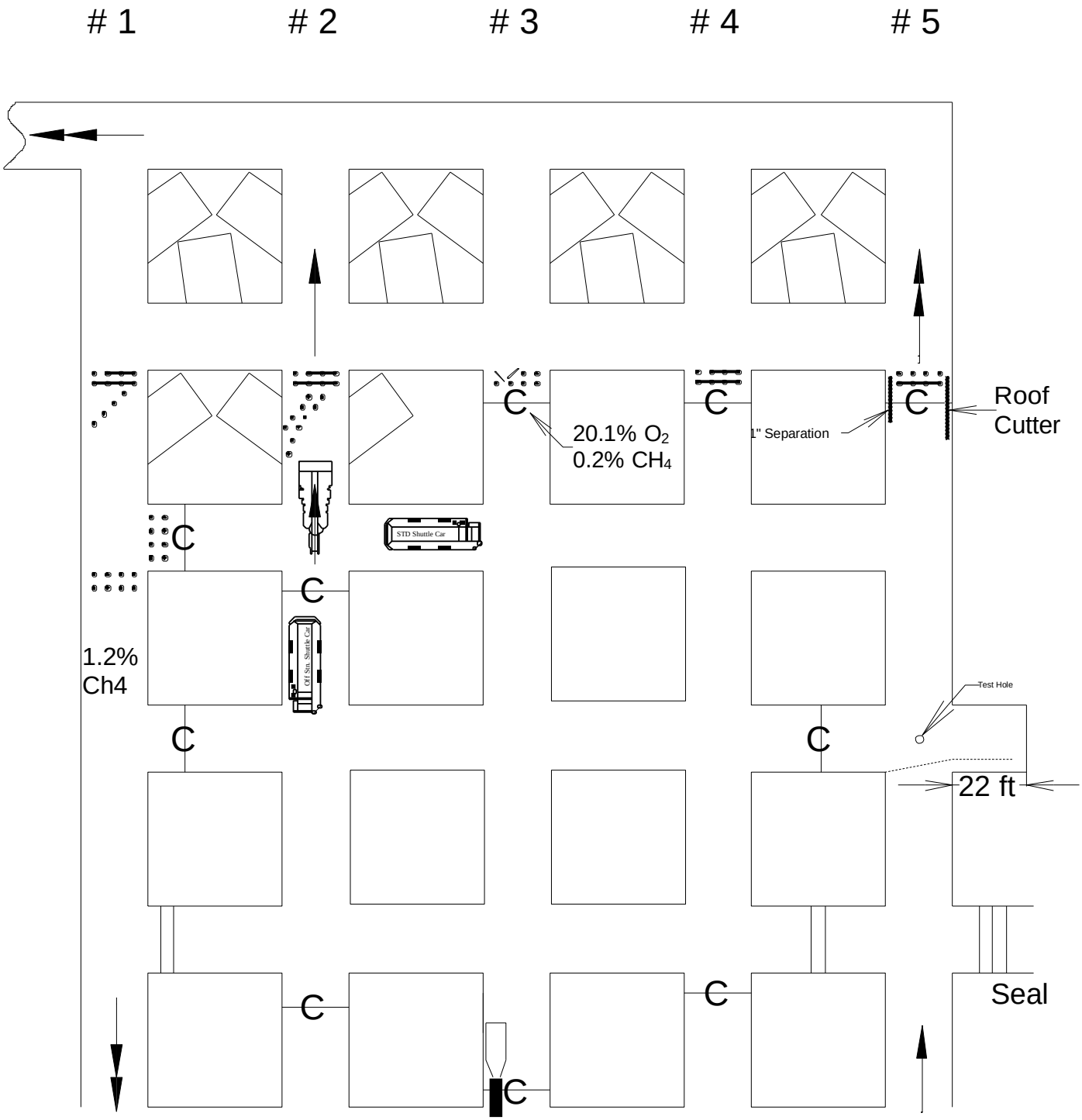
☐ A ventilation reading was taken at the intake end of the pillar line. The area measured 20' wide by 5' high and velocity was 170 feet per minute.

☐ Examination of the No. 5 entry revealed a roof cutter extending from the breaker timbers out by for 50 towards the Intersection. Fresh cracks and separation up to 1" wide in the roof were observed on the left rib from the breaker timbers extending out-by for 40 feet.

☐ A check of the continuous miner dust suppression system revealed 24 water sprays operational and water pressure on the machine was 80 psi. The approved ventilation and dust control plan requires 22 water sprays and water pressure of 180 psi.

The date is February 14, 2020 and you conducted the On-shift examination from 7:00 PM through 8:00 PM.

Instructions: As the Mine Foreman, you must: (1) Examine for hazardous conditions and violations of MSHA Safety and Health Standards. (2) Test for methane and oxygen deficiency, (3) Determine whether the air is traveling in its proper course and is of sufficient volume in each split. Taking into consideration all of the findings of your examination, complete the attached On-shift examination record in accordance with Virginia and MSHA requirements.



North Mains 001 Section

X – Oxygen/Methane Reading

D – Date, Time, Initials

V – Ventilation Reading

VIRGINIA UNDERGROUND MINE FOREMAN
ON-SHIFT EXAMINATION - PRACTICE EXERCISE

You are the evening shift foreman (VA certification No. 23456) and are conducting an On-shift examination of the section. Mark areas on the map where you would take oxygen and or methane readings with an **X.** Mark area(s) on the map where you would take ventilation reading(s) with a **V.** Mark locations on the map where you would certify **date, time,** and **initials** with a **D**. You have also observed the following conditions listed below. Mark each box that is a **Hazardous Condition** with an **H.** Mark each box that is a **Violation** with a **V. Hazardous conditions** are conditions that are likely to cause death or serious personal injury to persons exposed to such conditions. **Violations** are violations of 30 CFR Part 75 - Mandatory Safety and Health Standards.

H Methane reading in the immediate return is 1.2%

H Breaker timbers in the crosscut between No.1 and No.2 entries are set on timber butts

V Two (2) of eight breaker timbers set in No.3 entry have been dislodged as a result of immediate roof falling in the gob

H The ribs in No. 2 and No. 3 entries are sloughing. Bolts in the area are 36" to 48" from the rib; the roof control plan specifies a bolt spacing of 48 inches to the rib

V The area from the section belt tail-roller, extending outby for a distance of 300 feet needs rock dusting

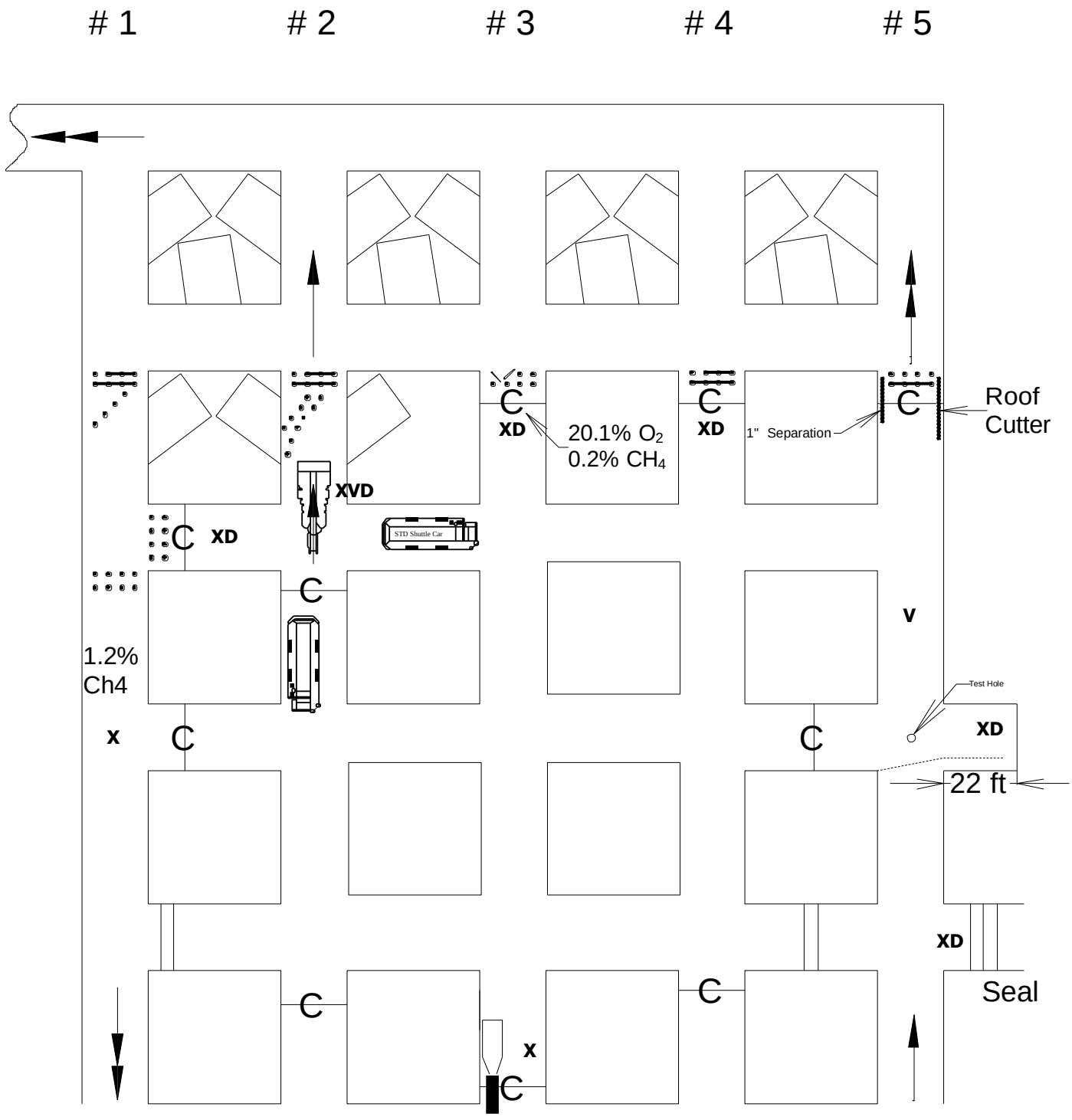
A ventilation reading was taken at the intake end of the pillar line. The area measured 20' wide by 5' high and velocity was 170 feet per minute

H Examination of the No. 5 entry revealed a roof cutter on the right rib side from the breaker timbers extending 50 feet out-by toward the intersection. A fresh crack and separation up to 1" wide in the roof were observed on the left rib side from the breaker timbers extending out-by 40 feet toward the intersection

V A check of the continuous miner dust control parameters revealed 24 operational water sprays and water pressure on the machine was 80 PSI. The approved ventilation plan (dust parameters) requires 22 water sprays and 180 PSI water pressure

The date is February 14, 2020 and you conducted the On-shift examination from 7:00 PM through 8:00 PM.

Instructions: As the Mine Foreman, you must: **(1)** examine for Hazardous Conditions and Violations of MSHA Mandatory Safety and Health Standards; **(2)** test for methane and oxygen deficiency; and **(3)** determine whether the air is traveling in its proper course and is of sufficient volume in each split. Taking into consideration all of the findings of your examination, complete the attached On-shift examination record in accordance with Virginia and MSHA requirements.



North Mains 001 Section

X – Oxygen/Methane Reading **V – Ventilation Reading**

D – Date, Time, Initials

Use Indelible Pencil or Ink

SAMPLE

ON-SHIFT CERTIFIED EXAMINER'S REPORT

Report Must be Signed When Made

Section/Area: North Mains

Reported Outside: Yes __ __ No __X__ Time __ AM/PM

Date: 2/14/20 Shift: Evening (2nd)

Received by _____
Authorized Person (Initials)

Report of Examination, Hazardous Conditions and Violations of Health/Safety Standards

Location	Results of Examination and Violations	Action Taken	% CH_4
1. #1			1.2% reduced to 0.4%
2. #2	None observed		0.0%
3. #3	2 of 8 breaker timbers - dislodged	Installed 8 additional breaker timbers	0.2%
4. #3 Feeder - Section belt	Section belt needs rock dusting - from feeder extending outby 300 feet	Applied rock dust to section belt - from feeder extending 300 feet	
5. #4	None observed		0.0%
6. #5			0.0%
7. Continuous miner - dust control parameters	Water pressure was 80 PSI - vent. plan requires 180 PSI	Water filter cleaned - water pressure increased to 180 PSI	
8.			
9.			
10.			
11.			
14.			

Identify, record and correct violations of health and safety standards with special emphasis on violations involving roof support, roof control plan, ventilation/methane, accumulations of combustible material, rock dust, travelways along belts, haulage roadways, track haulage roadways, guarding, and maintenance of belt conveyor components.

THIS RECORD TO BE RETAINED FOR ONE YEAR

AIR MEASUREMENTS **EXAMINATIONS FOR METHANE (NOT TO EXCEED 4 HOURS)**

Location	CFM	Location	Time	% CH_4
#5 entry - pillar intake -	17,000	#1 entry - 50 ft. outby	6:00 PM	0.2%
outby first crosscut		breaker timbers		
		#1 entry - 50 ft. outby	9:30 PM	0.3%
		breaker timbers		
* LOCC * Pillar Intake * Longwall Intake		* Immediate Returns		

Velocities: Longwall Headgate: _____ Longwall Tailgate: _____

Roof Bolt Checks:

No. of Bolts Tested: _____ No. of Bolts Torqued Above Range: _____ Below Range: _____

If majority of bolts tested in any working place falls outside approved torque range, state what action was taken: _____

Methane Monitor Functional Checks: Functional test - O.K. by Steve Owens

Remarks (Statement as to general conditions of mine or area of mine): Dust parameters checked by Jim Jones water pressure increased from 80 PSI to 180 PSI Examined seal - off intake - #5 entry - (CH4 - 0.2% and O_2 - 20.1%)

REPORT OF HAZARDOUS CONDITIONS ENCOUNTERED

Location	Hazardous Condition	Action Taken
#1	1.2% Methane detected in immediate return	Increased ventilation – methane reduced to 0.4%
#1 to #2	Breaker timbers - set on timber butts	Dangered off - installed 8 additional timbers
#5	At breaker timbers - roof cutter on right side - one inch roof crack on left side	Dangered off - installed 8 additional timbers outby dangered off area

Bill Deel	2/14/20	23456
Signed by On-shift Examiner(s)	Date	Certification Number(s)
Sam Givens	2/14/20	34567
Countersigned by Examiner's Supervisor	Date	Certification Number(s)
Jim Owens	2/14/20	
Countersigned by Operator/Agent	Date	

THIS RECORD TO BE RETAINED FOR ONE YEAR

Use Indelible Pencil or Ink

ON-SHIFT CERTIFIED EXAMINER'S REPORT

Report Must be Signed When Made

Section/Area: _____

Reported Outside: Yes ____ No ____ Time _____ AM/PM

Date: _____ **Shift:** _____

Received by _____
(Authorized Person) (Initials)

Report of Examination, Hazardous Conditions and Violations of Health/Safety Standards

Location	Results of Examination and Violations	Action Taken	% CH_4
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
Identify, record and correct violations of health and safety standards with special emphasis on violations involving roof support, roof control plan, ventilation/methane, accumulations of combustible material, rock dust, travelways along belts, haulage roadways, track haulage roadways, guarding, and maintenance of belt conveyor components.			

THIS RECORD TO BE RETAINED FOR ONE YEAR

AIR MEASUREMENTS			EXAMINATIONS FOR METHANE (NOT TO EXCEED 4 HOURS)		
Location	**CFM**		**Location**	**Time**	**% CH_4**
* LOCC * Pillar Intake		* Longwall Intake	* Immediate Returns		

Velocities: Longwall Headgate: _____ Longwall Tailgate: _____

Roof Bolt Checks:

No. of Bolts Tested: _____ No. of Bolts Torqued Above Range: _____ Below Range: _____

If majority of bolts tested in any working place falls outside approved torque range, state what action was taken: _____

_____

Methane Monitor Functional Checks: _____

_____

Remarks (Statement as to general conditions of mine or area of mine): _____

_____

_____

REPORT OF HAZARDOUS CONDITIONS ENCOUNTERED

Location	Hazardous Condition	Action Taken
.		

_____ _____ _____

Signed by On-shift Examiner(s) Date Certification Number(s)

_____ _____ _____

Countersigned by Examiner's Supervisor Date Certification Number(s)

_____ _____

Countersigned by Operator/Agent Date

THIS RECORD TO BE RETAINED FOR ONE YEAR

WEEKLY EXAMINATION
EXAMINATION FOCUS

A weekly examination must focus on specific, critical areas of emphasis:

1. Identify, record and correct hazardous conditions and violations of MSHA Mandatory Safety and Health Standards.
2. Test for methane and oxygen deficiency.
3. Ensure the ventilation system is effective and operating properly.
4. Ensure conditions do not develop that may inhibit the ventilation system.
5. Establish a record in a secure book.

<u>Hazardous Conditions</u> refer to conditions that are likely to cause death or serious personal injury to persons exposed to such conditions. <u>Violations</u> refer to violations of 30 CFR Part 75 - Mandatory Safety and Health Standards

- The purposes of weekly examinations are to: **(1)** record and correct hazardous conditions and violations; **(2)** ensure the ventilation system is effective and operating properly; and **(3)** ensure that mine travel ways, ventilation entries, escape ways, etc. are maintained in safe condition.
- The record required for weekly examinations is necessary to verify that mine examinations have been conducted and that hazardous conditions and violations have been recorded and corrected. This record also confirms review and response to hazardous conditions and MSHA Mandatory Safety and Health Standards by persons with responsibility at the mine.
- The weekly examinations are the primary means for evaluating the effectiveness of the mine ventilation system and identifying methane, low oxygen, water accumulations, unsafe roof/ribs, hazardous conditions and violations. Hazardous conditions observed during weekly examinations will be recorded for corrective action and "dangered off" to prevent entry of other miners, pending corrective action.

All records of examinations shall be maintained at the mine for at least one year.

Weekly Examination
Coal Mine Safety Laws of Virginia
§45.2-828

§45.2-703(B) Any Hazardous Condition that creates an Imminent Danger that cannot be removed within a reasonable time shall be reported to the Chief by the quickest available means

> **§45.2-828 Hazardous conditions shall be corrected immediately.** If the condition creates an Imminent Danger, then everyone except those persons necessary to correct the hazardous condition shall be withdrawn from the affected area to a safe location until the hazardous condition is corrected.

At least every seven (7) days, a mine foreman shall examine:

- Unsealed worked out areas where no pillars have been recovered
- Effectiveness of bleeder systems used under §45.2-837
- The following locations for hazardous conditions:
  - One entry of each intake air course in its entirety
  - One entry of each return air course in its entirety
  - Each escapeway in its entirety
  - Each Longwall travelway in its entirety
  - Each seal along return and bleeder air courses and at each seal along intake air courses not examined under §45.2-826
  - Each working section not examined under §45.2-826 during the previous seven (7) days

At least every seven (7) days, a certified person shall:

- Determine the volume of air entering the main intakes and in each intake split
- Determine the volume of air and test for methane in the last open crosscut; in the return of each split of air immediately before it enters the main returns and where the air leaves the main returns
- Test for methane in the return entry nearest each set of seals immediately after the air passes the seals

A weekly examination is not required during any seven (7) day period in which no person enters any underground area of the mine.

No person, except for certified persons required to make examinations, shall enter any underground area of a coal mine if the weekly examination has not been completed within the preceding seven (7) days. A weekly examination may be conducted at the same time as a Pre-shift examination.

§45.2-828.

When a mine is idled or in a non-producing status with entry only for maintenance

of the mine, weekly examinations may be conducted in accordance with a plan approved by the Chief.

The person conducting weekly examinations shall certify **initials, date,** and **time at enough locations to show the entire area has been examined**.

§45.2-830.

At the completion of any shift during which a portion of a weekly examination is: made, a record of hazardous conditions, their locations, the corrective action taken, and the locations and results of air and methane measurements shall be made. The record shall be made by the person making the examination or by a person designate by the operator. If the record is made by a person other than the examiner, then the examiner shall verify the record with initials and date in the record book.

A mine foreman or other certified person conducting an examination shall record the results of his examination in ink or indelible pencil in a book kept on the surface for that purpose.

Record of hazardous conditions found and corrective action taken shall be made by the completion of the shift on which the hazardous condition is found.

The supervisor of the examiner(s) shall read and countersign examination records; the operator may authorize another person with equivalent authority to read and countersign records during a temporary absence of the examiner's supervisor.

The person who countersigns examination records shall ensure that actions to eliminate or control hazardous conditions have been taken; records that DISCLOSE hazardous conditions require countersigning of the records no later than the end of the next regularly scheduled working shift following the shift for which the examination records were completed; records that DO NOT DISCLOSE hazardous conditions may be countersigned within 24 hours following the end of the shift for which the examination records were completed.

The actual level (percentage) of methane detected in any examination shall be recorded.

§45.2-831.

The mine foreman shall give prompt attention to the removal of all hazardous conditions reported to him by any person working in the mine; if impracticable to remove a hazardous condition at once, every person whose safety is affected shall remain away from the area where the hazardous condition exists.

§45.2-837.

Weekly examinations must be conducted in accordance with the approved bleeder plan.

CODE OF FEDERAL REGULATIONS (30 CFR)

Part 75 – Mandatory Safety Standards – Underground Coal Mines

Note: 2021 Revisions include 2012 (new MSHA Law Changes)

§75.363(a) Hazardous Conditions and Violations of Mandatory Safety and Health Standards; Posting, Correcting and Recording

1. Any hazardous condition found, by a mine foreman or equivalent mine official, assistant mine foreman or equivalent mine official, or other certified persons designated by an operator for the purposes of conducting examinations under Subpart D, shall be posted with a conspicuous danger sign where anyone entering the areas would pass.
2. A hazardous condition shall be corrected immediately or the area shall remain posted until the hazardous condition is corrected.
3. If a hazardous condition creates an Imminent Danger, then everyone except those persons referred to in Section 104(c) of the Act shall be withdrawn from the affected area to a safe area until the condition is corrected. Only persons designated by the operator to correct or evaluate the condition may enter the posted area.
4. Any Violation of an MSHA Mandatory Safety and Health Standard found during a Pre-shift, Supplemental, On-shift, or Weekly examination shall be corrected

(b) A record shall be made of any hazardous condition and any violation of the nine (9) Mandatory Safety and Health Standards found by a mine examiner:

1. This record shall be kept in a book maintained for this purpose on the surface of the mine.
2. The record shall be made by the completion of the shift on which the hazardous condition or violation of the nine (9) Mandatory Health or Safety Standards is found and shall include: (a) the nature and location of the hazardous condition or violation; and (b) the corrective action taken.
3. This record shall not be required for shifts when no hazardous conditions or violations of the nine (9) Mandatory Safety and Health Standards are found.

(e) Review of Citation and Orders

The Mine Operator shall review with Mine Examiners on a Quarterly Basis Citations and Orders issued in areas where Pre-shift, Supplemental, On-shift and Weekly examinations are required.

CODE OF FEDERAL REGULATIONS - 30 CFR

Part 75 – Mandatory Safety Standards – Underground Coal Mines

§75.364(a) Weekly Examinations

(a)Worked-out areas.

(1) At least every 7 days, a certified person shall examine unsealed worked-out areas where no pillars have been recovered by traveling to the area of deepest penetration; measuring methane and oxygen concentrations and air quantities and making tests to determine if the air is moving in the proper direction in the area. The locations of measurement points where tests and measurements will be performed shall be included in the mine ventilation plan and shall be adequate in number and location to assure ventilation and air quality in the area. Air quantity measurements shall also be made where the air enters and leaves the worked-out area. An alternative method of evaluating the ventilation of the area may be approved in the ventilation plan.

(2) At least every 7 days, a certified person shall evaluate the effectiveness of bleeder systems required by §75.334 as follows:

(i) Measurements of methane and oxygen concentrations and air quantity and a test to determine if the air is moving in its proper direction shall be made where air enters the worked-out area.

(ii) Measurements of methane and oxygen concentrations and air quantity and a test to determine if the air is moving in the proper direction shall be made immediately before the air enters a return split of air.

(iii) At least one entry of each set of bleeder entries used as part of a bleeder system under §75.334 shall be traveled in its entirety. Measurements of methane and oxygen concentrations and air quantities and a test to determine if the air is moving in the proper direction shall be made at the measurement point locations specified in the mine ventilation plan to determine the effectiveness of the bleeder system.

(iv) In lieu of the requirements of paragraphs (a)(2)(i) and (iii) of this section, an alternative method of evaluation may be specified in the ventilation plan provided the alternative method results in proper evaluation of the effectiveness of the bleeder system.

§75.364(b) ***Hazardous conditions and Violations of Mandatory Safety and Health Act.*** At least every seven (7) days, a certified person shall make examinations for hazardous conditions and violations specified in (b) 8 of this section at the following locations:

1. One entry of each intake air course in its entirety.

2. One entry of each return air course in its entirety.

3, Each long wall travel way in its entirety.

4. Each escape way in its entirety.

5. Each working section not examined under §75.360 (b) (3) during the previous seven (7) days.

6. Each water pump not examined during a Pre-shift examination conducted during the previous seven (7) days.

7. Each seal along return and bleeder air courses and at each seal along intake air courses not examined under §75.360 (b)(5).

8. Weekly examinations shall include examinations to identify Violation of the Mandatory Safety and Health Standards listed below:

(i) §§75.202(a) and 75.220(a)(1) - roof control;

(ii) §§75.333(h) and 75.370(a)(1) - ventilation, methane;

(iii) §§75.400 and 75.403 - accumulations of combustible materials and application of rock dust; and

(iv) §75.1403 - maintenance of off track haulage roadways, and track haulage, track switches, and other components for haulage;

(v) §75.1722(a) - guarding moving machine parts; and

(vi) §75.1731(a) - maintenance of belt conveyor components.

§75.364(c) ***Measurements and tests.*** At least every 7 days, a certified person shall -

(1) Determine the volume of air entering the main intakes and in each intake split;

(2) Determine the volume of air and test for methane in the last open crosscut in any pair or set of developing entries or rooms, in the return of each split of air immediately before it enters the main returns, and where the air leaves the main returns; and

(3) Test for methane in the return entry nearest each set of seals immediately after the air passes the seals.

§75.364 (d) Hazardous conditions shall be corrected immediately. If the condition creates an imminent danger, everyone except those persons referred to in section 104(c) of the Act shall be withdrawn from the area affected to a safe area until the hazardous condition is corrected. Any violation of the nine mandatory health or safety standards found during a weekly examination shall be corrected.

§75.364 (e) The weekly examination may be conducted at the same time as the Pre-shift or On-shift examination.

§75.364 (f) The weekly examination is not required during any seven (7) day period in which no one enters the mine. No person, except certified persons required to make the examinations, shall enter the mine if a weekly examination has not been completed within the previous seven (7) days.

§75.364 (g) ***Certification.*** The person making weekly examinations shall certify by initials, date and
time at enough locations to show the entire area has been examined.

§75.364 (h) ***Recordkeeping***

1. At the completion of any shift during which a portion of a weekly examination is conducted, a record of the results of each weekly examination, including a record of hazardous conditions and violations of the nine mandatory health or safety standards found during each examination and their locations, the corrective action taken, and the results and location of air and methane measurements, shall be made.
2. The results of methane tests shall be recorded as the percentage of methane measured by the examiner. The record shall be made by the person making the examination or a person designated by the operator. If made by a person other than the examiner, the examiner shall verify the record by initials and date by or at the end of the shift for which the examination was made.
3. The record shall be countersigned by the mine foreman or equivalent mine official by the end of the mine foreman's or equivalent mine official's next regularly scheduled working shift.
4. The records required by this section shall be made in a secure book that is not susceptible to alteration or electronically in a computer system so as to be secure and not susceptible to alteration.

§75.364 (i) ***Retention period.*** Records shall be retained at a surface location at the mine for at least 1 year and shall be made available for inspection by authorized representatives of the Secretary and the representative of miners.

Weekly Examination Practice Exercise

Information:

You are a certified first class mine foreman employed at Bee Gum Mining Company, Mine #1 and you have been assigned to conduct weekly examinations and complete the applicable record book as required by the Coal Mine Safety Laws of Virginia and the Code of Federal Regulations (30 CFR). Your first class mine foreman certification number is 23456.

You have completed the weekly examination on November 4, 2020 for the week ending November 7, 2020. The MSHA approved ventilation plan and the Coal Mine Safety approved bleeder plan require you to measure and record air readings and methane tests at all Measure Locations (ML), and Evaluation Points (EP). The plans require a minimum of 5,000 cubic feet per minute (cfm) air flow and allows not more than 2% methane (CH_4) at these locations.

The following information is provided for you to identify "hazardous conditions".

Definition: A "hazardous condition" means conditions that are likely to cause death or serious personal injury to persons exposed to such conditions.

Remember: corrective action must be taken for all hazardous conditions observed. For the purposes of this recordkeeping exercise, such action taken to correct hazardous conditions may include:

1. Danger off areas
2. Correct unsafe conditions
3. Remove equipment from service
4. Install timbers or cribs
5. Reduced Methane level
6. Pump water
7. Improve ventilation
8. Repair seals
9. Repair stoppings, etc.

This is a three (3) part exercise:

Part 1: This exercise requires you to review the information provided and identify the "hazardous conditions" and "violations".

Part 2: This exercise requires you to complete the weekly examination map. Instructions are provided on the map.

Part 3: This exercise requires you to document the weekly examinations in the weekly examination record book with the information provided on the weekly map "A" and hazardous conditions and violations in "Part 1".

Part 1

The following information is provided for you to identify hazardous conditions (H) and violations (V) by marking the appropriate box with an H or V. All hazardous conditions and violations marked correctly on this page must be recorded on the examiner's report with appropriate action taken.

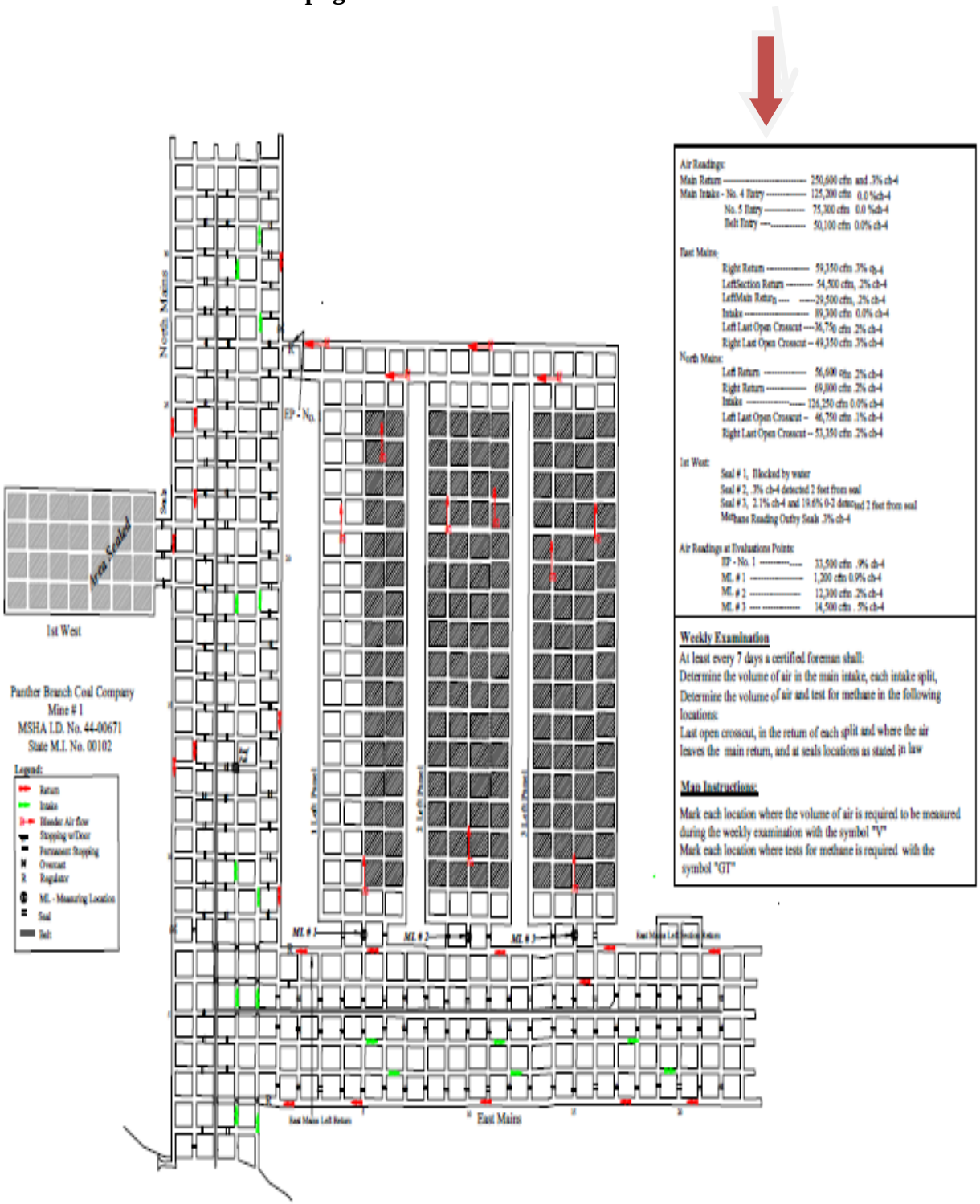
( ) North Mains Intake	A non-permissible pump was observed pumping water.
( ) North Mains Intake	A roof fall was located at crosscut #13 in the #4 entry and 2 timbers knocked loose.
( ) North Mains Right Return	Unsafe roof was properly supported 3 weeks prior and the area appears to be unchanged.
( ) North Mains Left Return	Unsafe roof (loose draw rock with ribs sloughing) was present at crosscut #21 for a distance of 20 feet.
( ) 1st West Seals; Seal #1	Water had accumulated and the seal could **not** be Properly examined because of water flowing out the top of the seal.
( ) 1st West Seal; Seal #3	With a legal gas check, 2.1% CH_4 and 19.6% O_2 was detected.
( ) East Mains Right Return	A loose brow was supported with timbers set on 4 foot centers.
( ) East Mains Left Return	The right side of a stopping was out at the top at crosscut #11 and 0.2% CH_4 and 20.8% O_2 were detected out by the location of the stopping.
( ) East Mains Intake	(Designated as primary escape way) Water had accumulated to a depth where water covered electrical controls on the non-permissible man trip at crosscut #10
( ) Measure Location ML#1	Air reading at ML#1 was 1,200 cfm and 0.9% CH_4 was detected.
( ) Measure Location ML #2	Air readings at ML#2 was 12,300 cfm and 0.2% CH_4 was detected.
( ) Measure Location ML #3	Air reading at ML#3 was 14,500 cfm and 0.5% CH_4 was detected.
( ) Measure Location ML #3	A loose roof bolt was discovered on the right side rib 2 feet from the date board.

( ) Evaluation Point

EP-# 1 Air reading at EP-# 1 was 33,500 and 0.9% CH_4 was detected.

Part 2

See next page for details in information box



Information Box on Map from previous page

Air Readings:
Main Return ---------- 250,600 cfm and .3% ch-4
Main Intake - No. 4 Entry ---------- 125,200 cfm 0.0 %ch-4
No. 5 Entry ---------- 75,300 cfm 0.0 %ch-4
Belt Entry ---------- 50,100 cfm 0.0% ch-4

East Mains:
Right Return ---------- 59,350 cfm .3% ch-4
LeftSection Return ---------- 54,500 cfm, .2% ch-4
LeftMain Return ---- ------29,500 cfm, .2% ch-4
Intake ---------- 89,300 cfm 0.0% ch-4
Left Last Open Crosscut ----36,750 cfm .2% ch-4
Right Last Open Crosscut -- 49,350 cfm .3% ch-4

North Mains:
Left Return ---------- 56,600 cfm .2% ch-4
Right Return ---------- 69,800 cfm .2% ch-4
Intake ----------------- 126,250 cfm 0.0% ch-4
Left Last Open Crosscut -- 46,750 cfm .1% ch-4
Right Last Open Crosscut -- 53,350 cfm .2% ch-4

1st West:
Seal # 1, Blocked by water
Seal # 2, .3% ch-4 detected 2 feet from seal
Seal # 3, 2.1% ch-4 and 19.6% 0-2 detected 2 feet from seal
Methane Reading Outby Seals .3% ch-4

Air Readings at Evaluations Points:
EP - No. 1 ---------- 33,500 cfm .9% ch-4
ML # 1 ---------- 1,200 cfm 0.9% ch-4
ML # 2 ---------- 12,300 cfm .2% ch-4
ML # 3 ---- ---------- 14,500 cfm . 5% ch-4

Weekly Examination

At least every 7 days a certified foreman shall:
Determine the volume of air in the main intake, each intake split,
Determine the volume of air and test for methane in the following locations:
Last open crosscut, in the return of each split and where the air leaves the main return, and at seals locations as stated in law

Map Instructions:

Mark each location where the volume of air is required to be measured during the weekly examination with the symbol "V"
Mark each location where tests for methane is required with the symbol "GT"

Part 3
WEEKLY - CERTIFIED EXAMINERS REPORT

Location/Date:	Violations/Action Taken	% CH_4	CFM	Initials

Identify, record and correct violations of health and safety standards with special emphasis on violations involving roof support, roof control plan, ventilation/methane, accumulations of combustible material, rock dust, travelways along belts, haulage roadways, track haulage roadways, guarding, and maintenance of belt conveyor components.

Hazardous Conditions

Location/Date	Hazardous Condition/Action Taken	Initials

Signed by Weekly Certified Examiner(s) _____ Date _____ Certification Number(s) _____

Countersigned by Examiner's Supervisor _____ Date _____ Certification Number(s) _____

Countersigned by Operator/Agent _____ Date _____

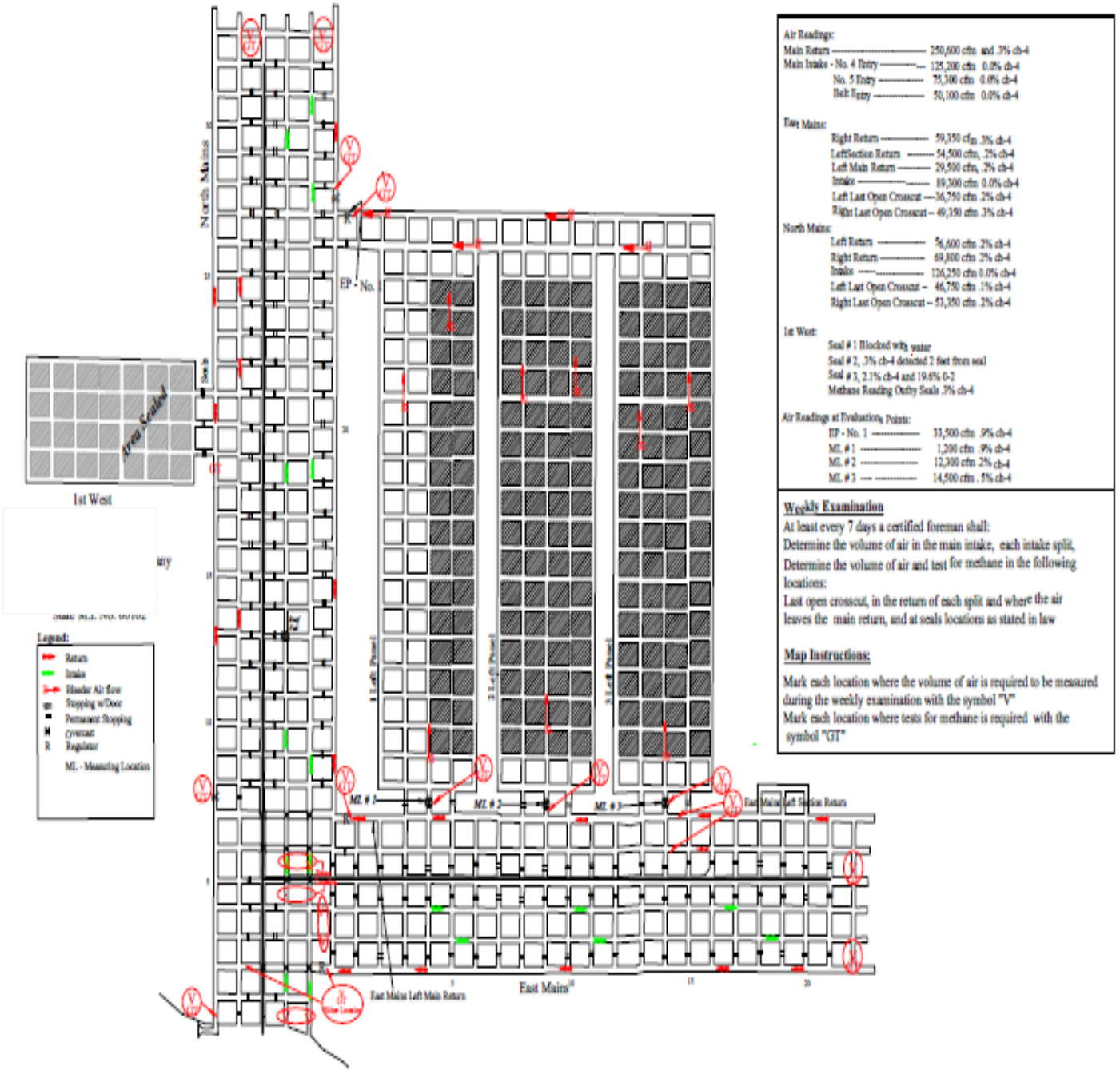
This record to be retained for one year.

Part 1

The following information is provided for you to identify <u>hazardous conditions (H) and violations (V)</u> by marking the appropriate box with an H or V. <u>All hazardous conditions and violations marked correctly on this page must be recorded on the examiner's report with appropriate action taken</u>.

❑ **North Mains Intake**	A non-permissible pump was observed pumping water.
(V) North Mains Intake	A roof fall was located at crosscut #13 in the #4 entry with <u>2</u> timbers knocked loose.
❑ **North Mains Right Return**	Unsafe roof was properly supported 3 weeks prior and the area appears to be unchanged.
(H) North Mains Left Return	Unsafe roof (loose drawrock with ribs sloughing) was present at crosscut #21 for a distance of 20 feet.
(H) 1st West Seals; Seal #1	Water had accumulated and the seal could <u>**not**</u> be properly examined because of water flowing out the top of the seal.
(V) 1st West Seal; Seal #3	With a legal gas check, 2.1% CH_4 and 19.6% O_2 was detected.
❑ **East Mains Right Return**	A loose brow was supported with timbers set on 4 foot centers.
(V) East Mains Left Return	The right side of a stopping was out at the top at crosscut #11 and 0.2% CH_4 and 20.8% O_2 were detected out by the location of the stopping.
(H) East Mains Intake	(Designated as primary escape way) Water had accumulated to a depth where water covered electrical controls on the non-permissible man trip at crosscut #10
(V) Measure Location ML#1	Air reading at ML#1 was 1,200 cfm and 0.9% CH_4 was detected.
❑ **Measure Location ML #2**	Air readings at ML#2 was 12,300 cfm and 0.2% CH_4 was detected.
❑ **Measure Location ML #3**	Air reading at ML#3 was 14,500 cfm and 0.5% CH_4 was detected.
(V) Measure Location ML #3	A loose roof bolt was discovered on the right side rib 2 feet from the date board.
❑ **Evaluation Point EP#1**	Air reading at EP-# 1 was 33,500 and 0.9% CH_4 was detected.

Part 2


Air Readings:
Main Return ---------- 250,600 cfm and .3% ch-4
Main Intake - No. 4 Entry ---------- 125,200 cfm 0.0% ch-4
No. 5 Entry ---------- 75,300 cfm 0.0% ch-4
Belt Entry ---------- 50,100 cfm 0.0% ch-4
East Mains:
Right Return ---------- 59,350 cfm .3% ch-4
LeftSection Return ------- 54,500 cfm, .2% ch-4
Left Main Return ---------- 29,500 cfm, .2% ch-4
Intake ----------..... 89,300 cfm 0.0% ch-4
Left Last Open Crosscut ---36,750 cfm .2% ch-4
Right Last Open Crosscut -- 49,350 cfm .3% ch-4
North Mains:
Left Return ---------- 56,600 cfm .2% ch-4
Right Return ---------- 69,800 cfm .2% ch-4
Intake -----.---------- 126,250 cfm 0.0% ch-4
Left Last Open Crosscut -- 46,750 cfm .1% ch-4
Right Last Open Crosscut -- 53,350 cfm .2% ch-4
1st West:
Seal # 1 Blocked with water
Seal # 2, .3% ch-4 detected 2 feet from seal
Seal # 3, 2.1% ch-4 and 19.6% 0-2
Methane Reading Outby Seals .3% ch-4
Air Readings at Evaluation Points:
EP - No. 1 ---------- 33,500 cfm .9% ch-4
ML # 1 ---------- 1,200 cfm .9% ch-4
ML # 2 ---------- 12,300 cfm .2% ch-4
ML # 3 --- ---------- 14,500 cfm . 5% ch-4
Weekly Examination
At least every 7 days a certified foreman shall:
Determine the volume of air in the main intake, each intake split,
Determine the volume of air and test for methane in the following locations:
Last open crosscut, in the return of each split and where the air leaves the main return, and at seals locations as stated in law
Map Instructions:
Mark each location where the volume of air is required to be measured during the weekly examination with the symbol "V"
Mark each location where tests for methane is required with the symbol "GT"
Legend:
Return
Intake
Bleeder Air flow
Stopping w/Door
Permanent Stopping
Crosscut
Regulator
ML - Measuring Location
North Mains
Area Sealed
1st West
EP - No. 1
ML # 1
ML # 2
ML # 3
East Mains
East Mains Left Main Return

Part 3
WEEKLY - CERTIFIED EXAMINERS REPORT

Location/Date:	Violations/Action Taken	% CH_4	CFM	Initials
Main Return		0.3%	250,600	Name or Initials
Main Intake		0.0%	200,500	Name or Initials
Belt Entry		0.0%	50,100	Name or Initials
East Mains Right Returns		0.3%	59,350	Name or Initials
East Mains Left Section Returns	The right side of a stopping was out at the top at crosscut #11 (V) Repaired Stopping	0.2%	57,500	Name or Initials
East Mains Main Return		0.2%	29,500	Name or Initials
East Mains Intake		0.0%	89,300	Name or Initials
East Mains Left Last Open Crosscut		0.2%	36,750	Name or Initials
East Mains Right Last Open Crosscut		0.3%	49,350	Name or Initials
North Mains Left Return		0.2%	56,600	Name or Initials
North Mains Right Return		0.2%	69,800	Name or Initials
North Mains Intake	2 timbers knocked loose at crosscut #13 / #4 entry (V) Reset timbers	0.0%	126,250	Name or Initials
North Mains Left Last Open Crosscut		0.1%	46,750	Name or Initials
North Mains Right Last Open Crosscut		0.2%	53,350	Name or Initials
1st West #3 Seal	2.1% CH_4 and 19.6% O_2 was detected (V) Reduce methane level to below 1.0%	2.1%		Name or Initials

Outby 1st West Seals		0.3%		Name or Initials
EP #1		0.9%	33,500	Name or Initials
ML #1	Air reading was 1,200 cfm and 2.2% CH_4 (V) Increased ventilation	0.9%.	1,200	Name or Initials
ML #2		0.2%	12,300	Name or Initials
ML #3	A loose roof bolt on the right side rib 2 feet from the date board. (V) Installed supports	0.5%	14,500	Name or Initials

Identify, record and correct violations of health and safety standards with special emphasis on violations involving roof support, roof control plan, ventilation/methane, accumulations of combustible material, rock dust, travelways along belts, haulage roadways, track haulage roadways, guarding, and maintenance of belt conveyor components.

Hazardous Conditions

Location/Date	Hazardous Condition/Action Taken	Initials
North Mains Left Returns	Unsafe roof (loose draw rock with ribs sloughing) was present at crosscut #21 for a distance of 20 feet. (H) Danger off or corrected unsafe condition	Name or Initials
East Mains Intake	Water had accumulated to a depth where water covered electrical controls on the non-permissible mantrip at crosscut #10 (H) Pumped water	Name or Initials
1st West Seals Seal #1	Water had accumulated and the seal could **not** be properly examined because of water flowing out the top of the seal. (H) Pumped water, repaired seal and examined	Name or Initials

Signed by Weekly Certified Examiner(s) | Date | Certification Number(s)

Countersigned by Examiner's Supervisor | Date | Certification Number(s)

Countersigned by Operator/Agent | Date

This record to be retained for one year.

SECTION 13 – PRACTICAL EXERCISES

The Mine Foreman certification examination includes practical sections on the following: (1) Roof Control (2) Roof Control Plans (3) Ventilation (4) Weekly Ventilation Examination and (5) Mine Emergency exercise.

The following similar practical exercises are designed to familiarize applicants with these types of exercises.

1. Roof Control

A. Condition: The mine roof in the # 3 heading consists of extremely soft dark shale laminated with several coal streaks in a test hole drilled 5' deep. No other abnormal conditions were detected. Check the best solution of the potential roof support alternatives listed below:

☐ Mine the entries the maximum width allowed in the roof control plan

☐ Leave the roof bolting to the next shift

☐ Support the roof with resin anchored roof bolts

☐ Support the roof with mechanical anchored roof bolts

B. Condition: A crosscut is projected to turn right out of the belt entry. A mud filled "hill seam" is present and extending across the belt entry and through the area where the crosscut will be mined. Check the best solution of those listed below:

☐ Mine the crosscut as projected

☐ Narrow the crosscut width

☐ Install longer bolts

☐ Move the crosscut to a different location to miss the hill seam

C. Condition: Mechanical roof bolts are being installed on the active section. Roof bolt torques taken from the face outby through the last open crosscut in the #3 entry indicate that 30 of the 45 roof bolts checked were less than the approved evaluation torque range for these bolts. Check the best solution of those listed below:

☐ Do more frequent examinations of the area

☐ Skip the place and leave for the down shift

☐ Add additional roof bolts of the same type

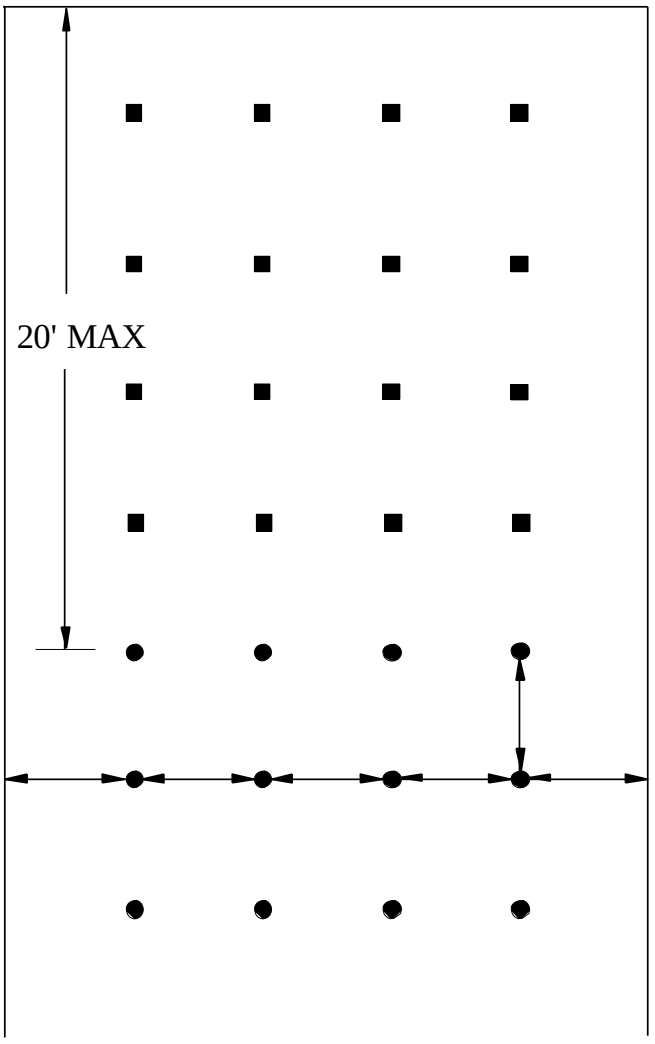
☐ Add supplemental support (longer bolts, different bolts, etc.)

D. Condition: Three cut partial pillar recovery is being done on your section. As you enter the #5 entry, some draw rock has fallen. Further examination reveals a high angle slickenside lying across the entry parallel with the cut to be mined. The slickenside extends through the coal pillar into the gob area. Check the best solution of those listed below:

- ☐ Mine the area as projected
- ☐ Wedge the slickenside and watch for movement
- ☐ Evaluate the roof, drill test holes to identify the thickness of the slickenside
- ☐ Skip the cut due to the size and orientation of the slickenside

2. Roof Control Plan

A. Exercise No. 1



INSTRUCTIONS:

CHECK TYPE OF ROOF DRILL USED AT YOUR MINE

☐ SINGLE HEAD (FIXED)

☐ SINGLE HEAD (SWING)

☐ DOUBLE HEAD

☐ INSIDE CONTROLS

☐ OUTSIDE CONTROLS

FILL IN DISTANCES BETWEEN ROOF BOLTS INDICATED BY THE ARROWS (⟷)

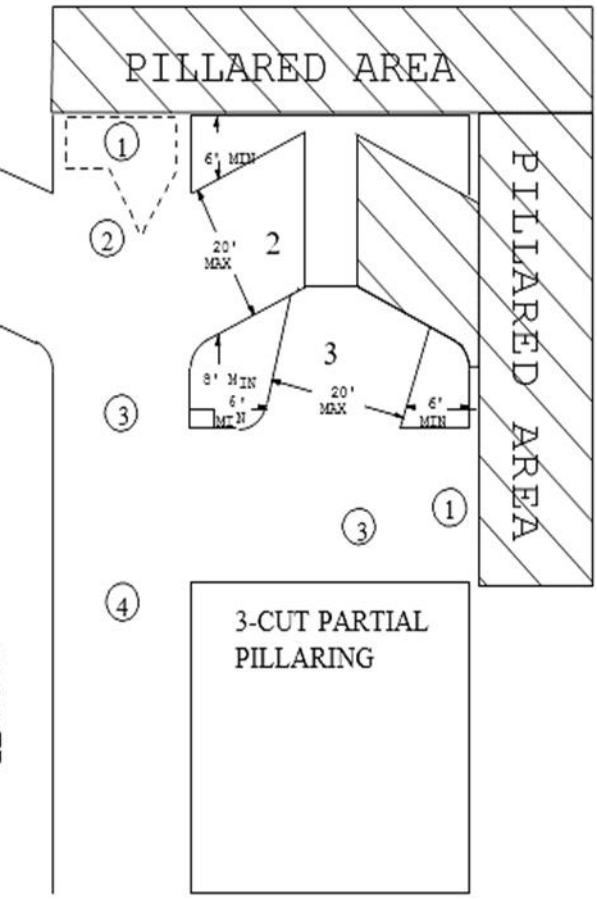
● THIS SYMBOL INDICATES ROOF BOLTS INSTALLED IN THE PREVIOUS CUT.

■ THIS SYMBOL INDICATES A ROOF BOLT TO BE INSTALLED.

BASED ON THE TYPE OF ROOF DRILL CHECKED ABOVE, NUMBER THE ROOF BOLTS IN THE SEQUENCE OF INSTALLATION AS REQUIRED IN THE APPROVED ROOF CONTROL PLAN.

PLACE A NUMBER UNDER EACH SQUARE TO INDICATE THE INSTALLATION SEQUENCE

Roof Control Plan
B. Exercise No. 2



INSTRUCTIONS:

SHOWN ON THE PILLAR SKETCH IS THE FINAL THREE CUTS TO BE MINED IN A ROW OF PILLARS UTILIZING A 3-CUT PARTIAL PILLARING METHOD.

1. NUMBER THE CUTS TO BE MINED IN THE SEQUENCE REQUIRED IN THE APPROVED ROOF CONTROL PLAN.

2. DRAW BREAKER AND ROADWAY POSTS IN THE LOCATIONS REQUIRED IN THE APPROVED ROOF CONTROL PLAN FOR EACH CUT TO BE MINED.

3. NUMBER THE GROUPS OF POSTS INSTALLED TO CORRESPOND WITH THE CUTS MINED.

3. Ventilation

a. The student will be required to take an air reading using an anemometer and calculating the quantity of airflow in an example mine entry. The student will use an actual anemometer to take an air reading, read the velocity from the anemometer, and then apply the correction factor to determine the actual air velocity. Examples are:

   i. A mine opening measures 4 ft. 6 inches high and 19 feet wide. Calculate the air quantity if a reading of 263 feet per minute has been obtained with an anemometer. Reading correction chart on the side of the anemometer gives a correction factor of minus 22. What is the quantity of airflow through the entry?

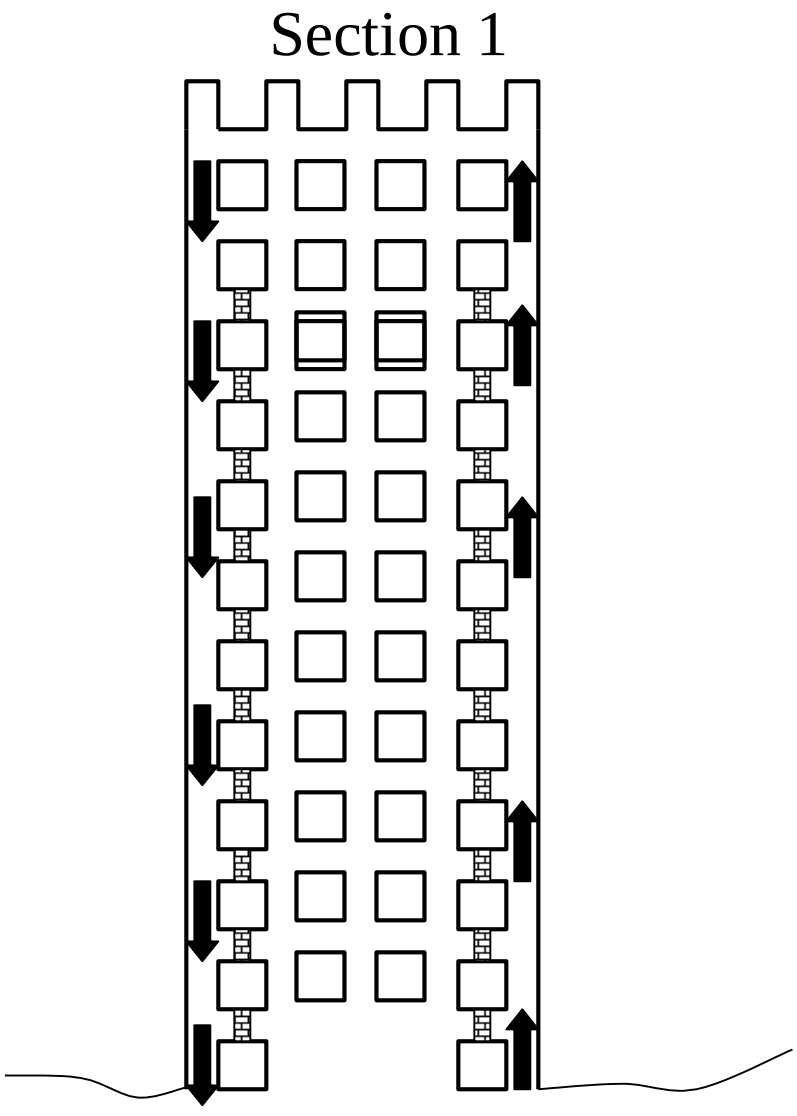
   ii. A mine opening measures 3 ft. 11 inches high and 19 ft. 7 inches wide. The air reading taken with an anemometer is 337 fpm. The correction factors for the anemometer are plus 11 at 300 fpm and plus 16 at 350 fpm. What is the quantity of airflow through the entry?

b. The student is required to calculate the mean entry air velocity of a typical mine entry. Examples are:

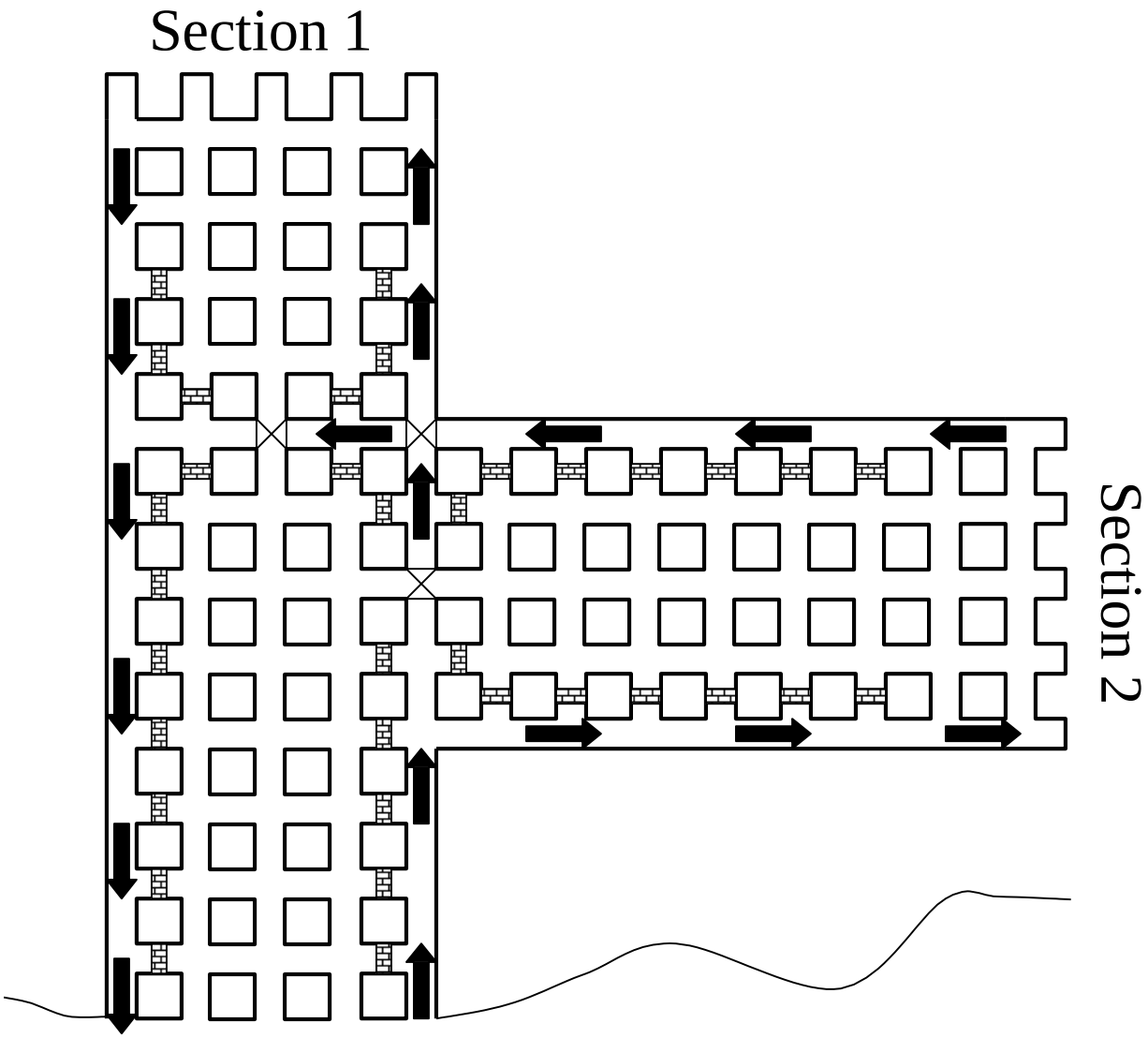
   i. An air reading with an anemometer behind the curtain in the No. 2 heading gives an air reading of 277 fpm. Correction factor for this velocity is minus 13. The area behind the curtain is 4 ft. 1 inches high by 3 ft. 11 inches wide. The entry measures 4 ft. 1 inch high by 19 ft. 5 inches wide. What is the mean entry air velocity? Does this mean entry air velocity meet the requirements established by the Code of Federal Regulations?

   ii. An air reading with an anemometer behind the curtain in the No. 4 heading gives an air reading of 426 fpm. Correction factors for the anemometer are minus 3 at 400 fpm and minus 9 at 450 fpm. The height of the entry is 4 ft. 6 inches. The width of the entry is 20 ft. 0 inches and the area behind the curtain is 4 ft. wide. What is the mean entry air velocity? Does this mean entry air velocity meet the requirements established by the Code of Federal Regulations?

4. **Weekly Examinations**
    a. **Determine the locations where weekly air readings are required.**



b. Determine the locations where weekly air readings are required.



5. Mine Emergencies

Responsible Person / Surface Person Mine Emergency Knowledge Questions

(1) Your mine fan is exhausting and a fire has occurred at a belt drive. Which direction will smoke and gases travel?

A. Outby to the surface
B. Inby to the Section
C. Out-by to the next ventilation door
D. None of the above will apply

(2) Your mine fan is blowing and a fire has occurred at a belt drive. Which direction will smoke and gases travel?

A. Outby to the surface
B. Inby to the Section
C. Out-by to the next ventilation door
D. None of the above will apply

(3) Your mine fan is blowing and has a single split of intake air. A battery scoop fire occurs in one of the two common intake entries. Which parts of the mine will be contaminated with smoke and fire gases?

A. Only the return entry outby the fire location
B. Only the intake entry inby the fire location
C. Only the belt entry outby the fire location
D. The entire mine from the fire location extending inby

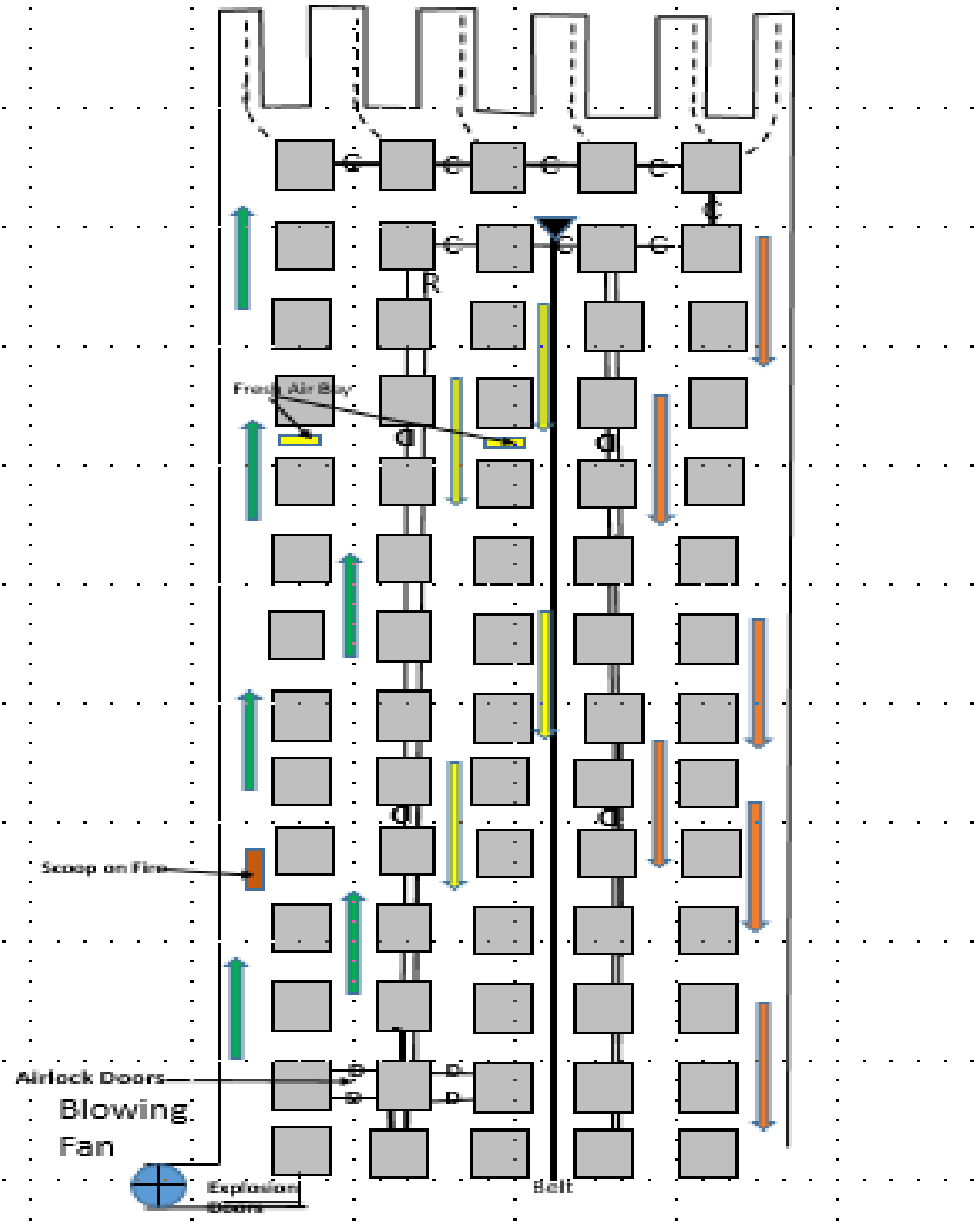
(4) What are the first two notifications immediately following a mine emergency?

A. MSHA and State Agencies
B. Call the Mine Owner
C. The RP and everyone underground that an emergency exists.
D. Call the Scoop man and the truck drivers

(5) A fire has occurred at a belt drive. How long do you have to report to MSHA?

A. At once if not extinguished within15 minutes
B. At once if not extinguished within10 minutes
C. As soon as you are aware a fire exists
D. There is no time limit to notify MSHA

Mine Emergency Exercise



It is the beginning of the day shift at the mine. The Foreman and 10 miners have traveled inside and arrived on the section. The scoop operator remained behind on the surface to load supplies and is now ready to travel to the section. The section is approximately 9, 875 feet from the surface. The scoop operator starts traveling inside. When his is about 4 crosscuts inside the scoop stops running and a very loud blast occurs. The scoop batteries start smoking very heavily then burst into flames. The scoop operator activates the fire suppression system on the machine but it has little effect on the raging fire. The operator then exits the scoop and travels outside to the surface where he locates the surface attendant. The surface attendant has been trained in emergency procedures. Using the map on the preceding page as well as the information provided answer the following questions.

(1) What is the first action that should be taken by the scoop man and surface attendant?

A. Travel to where the scoop is with fire extinguishers to put out the fire
B. Call MSHA and State officials
C. Try immediately to contact the RP, all persons on the section, and all persons outby the section
D. Contact the Safety Department

(2) The surface person is able to contact the section foreman who is also the RP. What should the section foreman do next?

A. Check to see how bad the smoke is on the section and if not bad go ahead and keep running coal.
B. Check all working places to insure there is no buildup of methane.
C. Round up and account for all personnel on the section and prepare to evacuate the mine.
D. Call the belt man and ask him to go see how bad the fire is.

(3) The section foreman and the crew have arrived at the mantrip. What should the foreman do next?

A. Tell everyone to go ahead and eat their lunch
B. Call the surface attendant and inform him of the following:
   (i) All personnel on the section are accounted for and ready to travel
   (ii) The crew has erected a curtain over the belt regulator to help prevent the smoke from traveling down the belt entry.
   (iii) The foreman and the crew will be traveling out the belt entry and attempt to stay in communication as they travel out.
C. Send two men to move the oxygen and acetylene tanks to the return
D. Travel down to the belt drive and wait to see if the smoke clears out.

(4) As the crew is about to depart from the section on the mantrip, the foreman notices that the smoke in the belt entry is getting denser and his CO alarm is alarming on his detector. What should the foreman do now?

A. Tell everyone to go get in the return airway quickly
B. Have everyone don their SCSR and load onto the man trip
C. Have everyone wait until the foreman checks out how bad the smoke is
D. Have everyone get their SCSR ready but don't put it on until smoke gets worse

(5) The foreman and the crew has arrived at the fresh air bay which also has an SCSR Cache. What should the foreman do next?

A. Instruct the crew to get the spare SCSR's and load on the man trip.
B. Instruct the crew to install check curtains across #3 and # 4 entries while the foreman goes over to the return brattice and open up the man door to help short circuit the smoke to the return.
C. Instructs the crew to get the spare SCSR's and get in the fresh air bay.
D. Both A and B are correct answers

Practical Exercises - Answers

I. Roof Control

A. Support the roof with resin anchored roof bolts

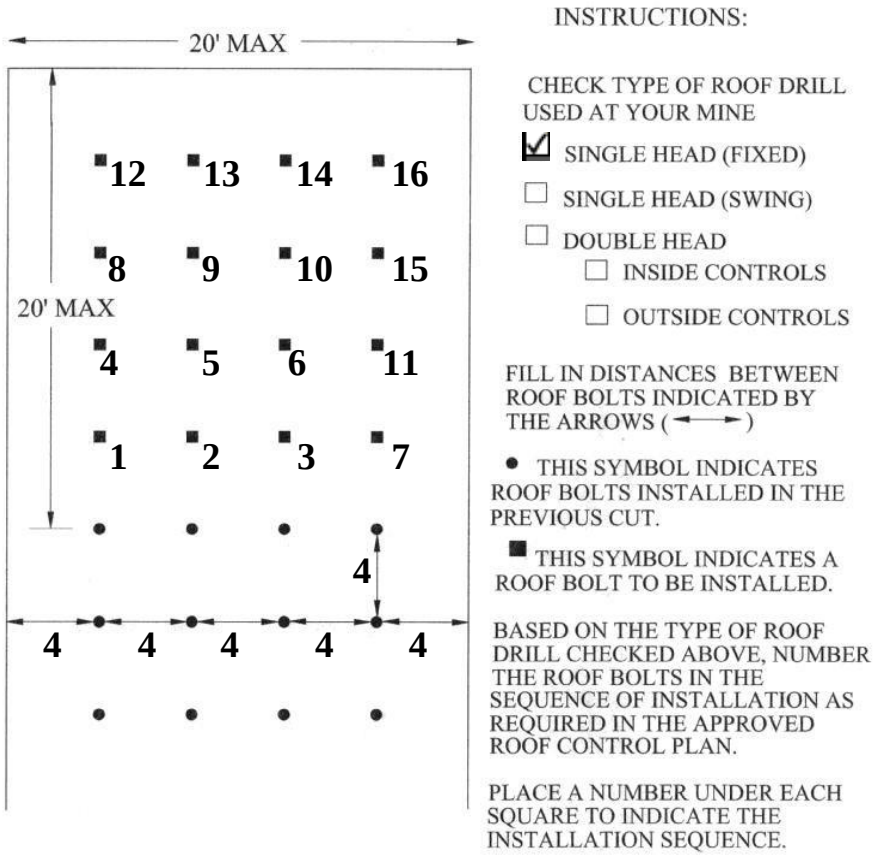
B. Move the crosscut to a different location to miss the hill seam

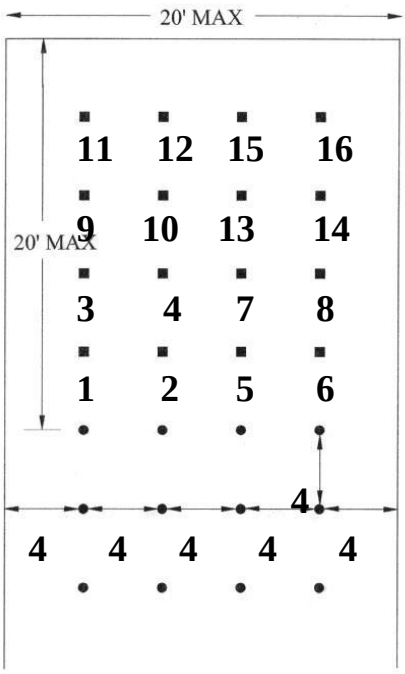
C. Add supplemental support (longer bolts, different bolts, etc.)

D. Skip the cut due to the size and orientation of the slickenside

II. Roof Control Plan

A. Bolting Sequence Possible Answers





INSTRUCTIONS:

CHECK TYPE OF ROOF DRILL USED AT YOUR MINE

- ☐ SINGLE HEAD (FIXED)
- ☑ SINGLE HEAD (SWING)
- ☐ DOUBLE HEAD
  - ☐ INSIDE CONTROLS
  - ☐ OUTSIDE CONTROLS

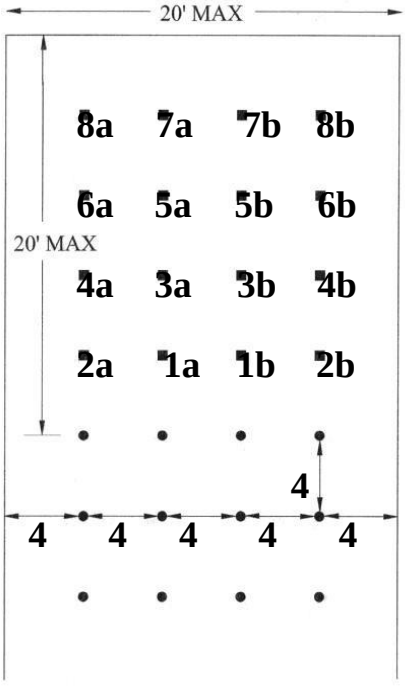
FILL IN DISTANCES BETWEEN ROOF BOLTS INDICATED BY THE ARROWS (◄——►)

• THIS SYMBOL INDICATES ROOF BOLTS INSTALLED IN THE PREVIOUS CUT.

■ THIS SYMBOL INDICATES A ROOF BOLT TO BE INSTALLED.

BASED ON THE TYPE OF ROOF DRILL CHECKED ABOVE, NUMBER THE ROOF BOLTS IN THE SEQUENCE OF INSTALLATION AS REQUIRED IN THE APPROVED ROOF CONTROL PLAN.

PLACE A NUMBER UNDER EACH SQUARE TO INDICATE THE INSTALLATION SEQUENCE.



INSTRUCTIONS:

CHECK TYPE OF ROOF DRILL USED AT YOUR MINE

- ☐ SINGLE HEAD (FIXED)
- ☐ SINGLE HEAD (SWING)
- ☐ DOUBLE HEAD
  - ☑ INSIDE CONTROLS
  - ☐ OUTSIDE CONTROLS

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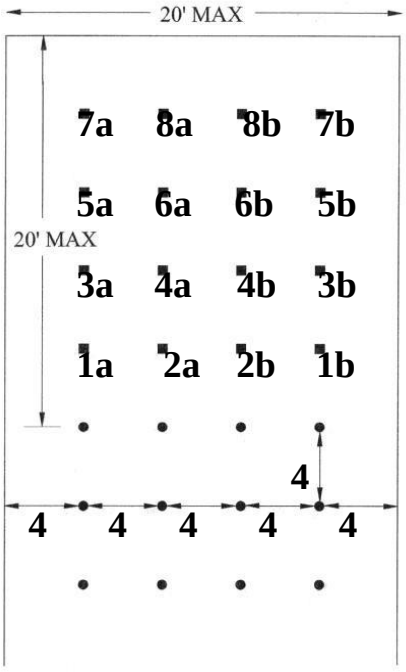


INSTRUCTIONS:

CHECK TYPE OF ROOF DRILL USED AT YOUR MINE

- ☐ SINGLE HEAD (FIXED)
- ☐ SINGLE HEAD (SWING)
- ☐ DOUBLE HEAD
  - ☐ INSIDE CONTROLS
  - ■ OUTSIDE CONTROLS

FILL IN DISTANCES BETWEEN ROOF BOLTS INDICATED BY THE ARROWS (⟷)

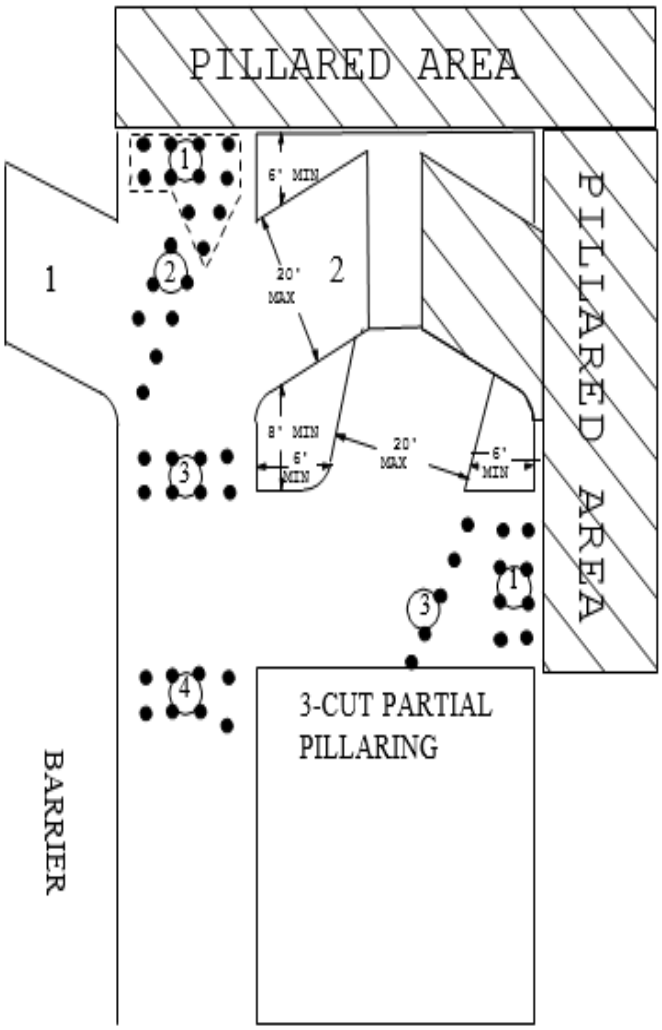
• THIS SYMBOL INDICATES ROOF BOLTS INSTALLED IN THE PREVIOUS CUT.

■ THIS SYMBOL INDICATES A ROOF BOLT TO BE INSTALLED.

BASED ON THE TYPE OF ROOF DRILL CHECKED ABOVE, NUMBER THE ROOF BOLTS IN THE SEQUENCE OF INSTALLATION AS REQUIRED IN THE APPROVED ROOF CONTROL PLAN.

PLACE A NUMBER UNDER EACH SQUARE TO INDICATE THE INSTALLATION SEQUENCE.

Exercise Number 2



INSTRUCTIONS:

THREE CUTS TO BE MINED IN A ROW OF PILLARS UTILIZING A 3-CUT PARTIAL PILLARING METHOD.

1. NUMBER THE CUTS TO BE MINED IN THE SEQUENCE REQUIRED IN THE APPROVED ROOF CONTROL PLAN.

2. DRAW BREAKER AND ROADWAY POSTS IN THE LOCATIONS REQUIRED IN THE APPROVED ROOF CONTROL PLAN FOR EACH CUT TO BE MINED.

3. NUMBER THE GROUPS OF POSTS INSTALLED TO CORRESPOND WITH THE CUTS MINED.

Ventilation

3. Ventilation

a. Air Quantity Calculations

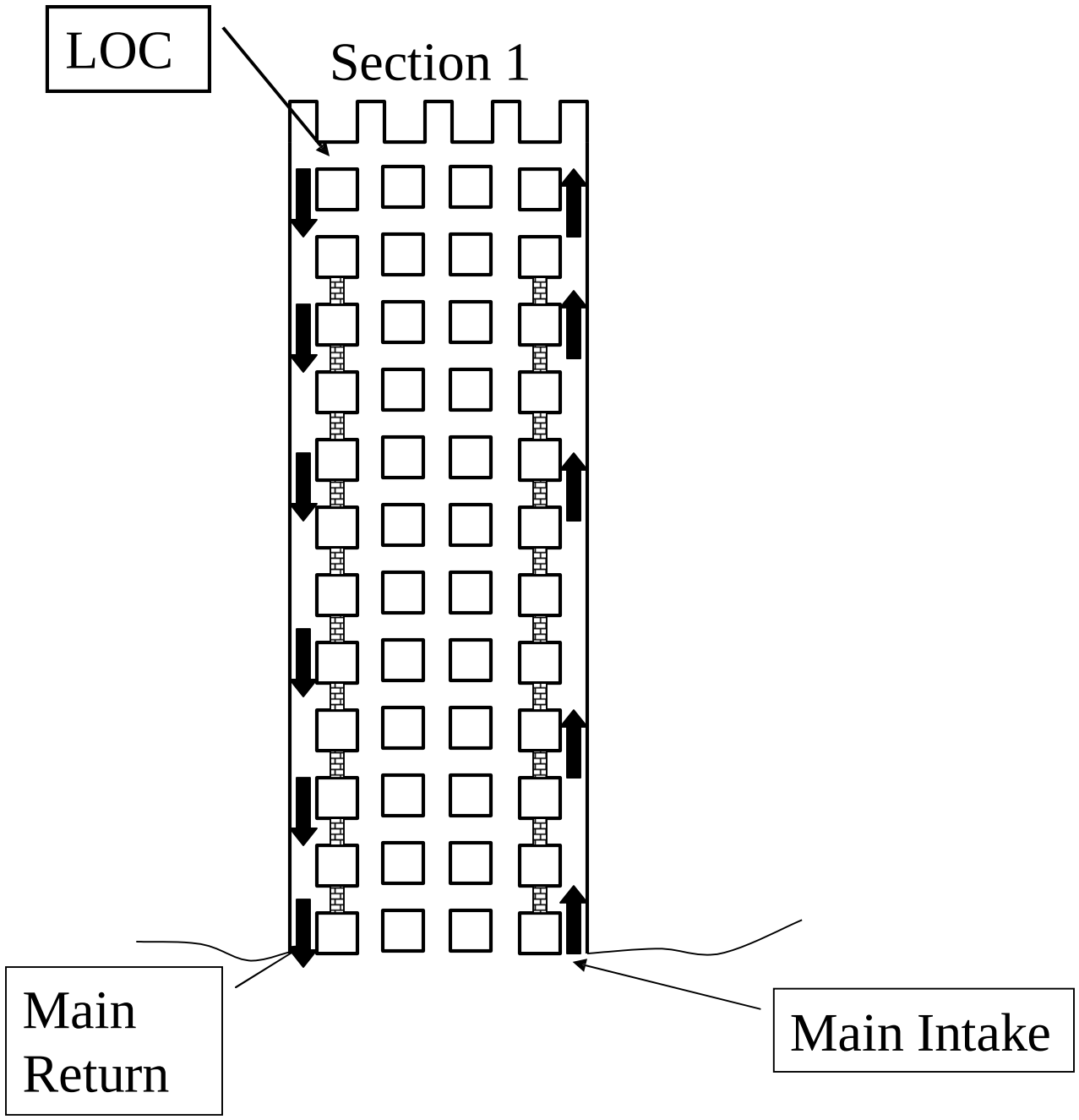
- ❑ The area of mine opening is 4.5 X 19 or 85.5 square ft. Velocity is 263 minus 22 or 241 feet per minute. The air quantity is 85.5 X 241 or 20,606 cubic feet per minute.
- ❑ The height of the mine opening is 3 ft. 11 inches or 3.92 ft. The width is 19 ft. 7 inches or 19.58 ft. The area is 3.92 X 19.58 or 76.75 sq. ft. The velocity correction is approximately plus 4. The correction factor is either estimated or calculated by dividing 37 by 50 and multiplying by the difference in correction factor for 300 and 350 or 5. Final velocity is 337 plus 4 or 341. Airflow is 76.75 X 341 or 26,172 cfm.

b. Mean Entry Velocity Calculations

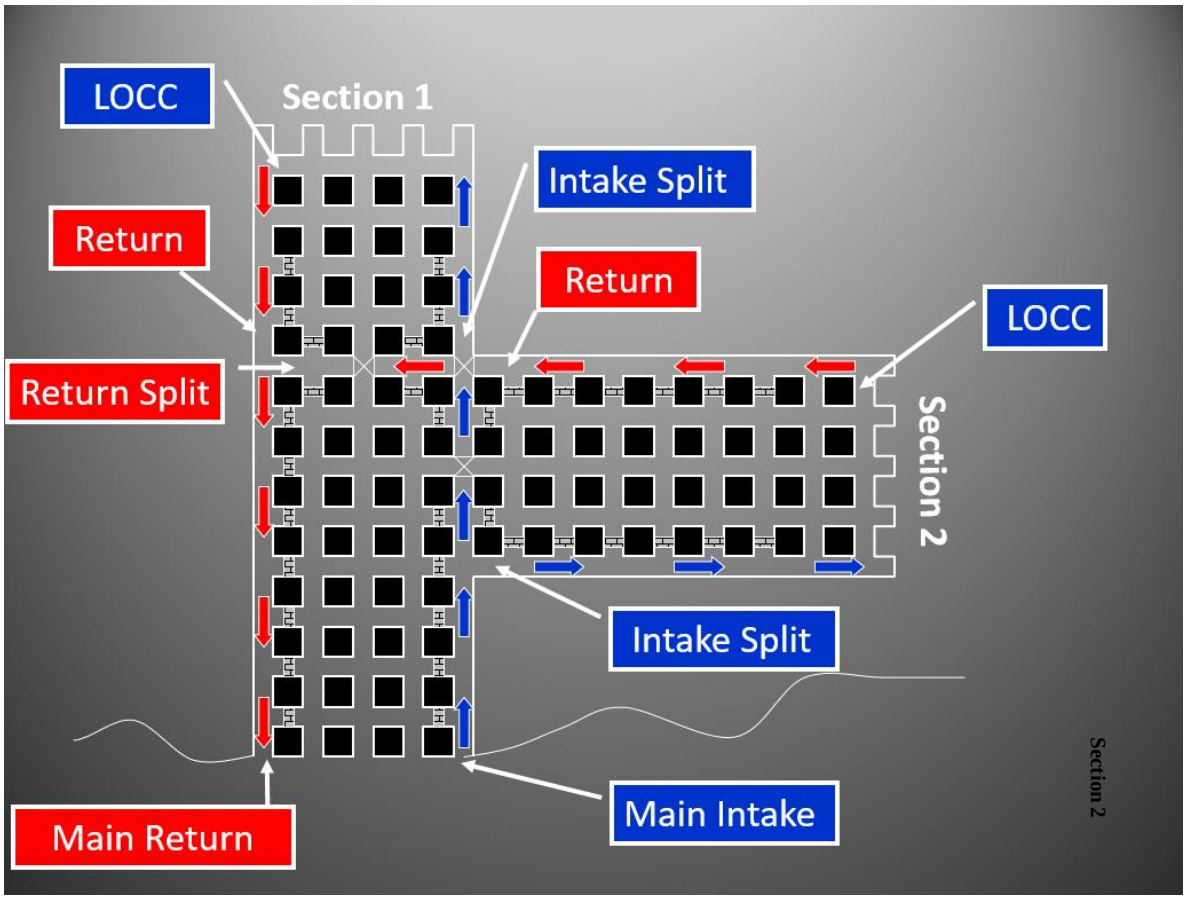
- ❑ Corrected air velocity is 277 minus 13 or 264 fpm. Areas behind the curtain is 4.08 (4 ft. 1 inch) X 3.92 (3 ft. 11 inches) or 16 sq. ft. Volume behind curtain is 264 X 16 or 4,223 cfm. Width of entry in front of curtain is 19.42 (19ft. 5 inches) minus 3.92 or 15.5 ft. Area in front of curtain is 4.08 X 15.5 or 63.24 sq. ft. MEV is 4,223 divided by 63.24 or 68 fpm. Yes, this does meet the minimum requirements of 30CFR of 60 fpm MEV.
- ❑ Corrected velocity behind curtain is 426 minus 6 or 420 fpm. Area behind the curtain is 4.5 ft. X 4 ft. or 18 sq. ft. Quantity behind curtain is 420 X 18 or 7,560 cfm. Area in front of curtain is 20 minus 4 or 16 ft. wide X 4.5 ft. high or 72 sq. ft. MEV is 7,560 divided by 72 or 105 fpm. Exceeds CFR requirement.

4. Weekly Examinations

a. Required Weekly Examinations



b. Required Weekly Examinations



Answers

5. Responsible Person/ Surface Person Mine Emergency Knowledge Exercise
(See P. 285)

1. B
2. A
3. D
4. C
5. B

Answers

Mine Emergency Exercise (See Page 286)

1. C
2. C
3. B
4. B
5. D

Section 14: Mine Plans

Bleeder Plan

Emergency Response Plan

Smoker's Search Program

Fan Stoppage Plan

Substance Abuse Program Policy

Pushing Cars Plan

BLEEDER PLAN

.	.
Company Name	Mine Name or Number
.	.
Date	Mine Index Number

General:

1. A wrap around type bleeder system or other equally effective means, approved by the Chief, will be used to ventilate worked out areas of the mine whether pillared or non-pillared.

Ventilation Control:

2. Permanent ventilation controls will be used to direct and regulate air flow through the bleeder system and into main returns.

3. The bleeder system will be designed such that changes in the barometric pressure will not adversely affect the flow of air in the system.

4. A measurable movement of air will be maintained at all approved bleeder evaluation locations. The volume of air flow will be sufficient to maintain normal levels of methane and oxygen at all times.

5. Positive control of the bleeder air flow will be maintained at all times by utilization of strategically placed regulation.

6. Ventilation controls will be maintained as approved in the Bleeder Plan to ensure that the bleeder air flow is coursed as indicated.

Examinations and Actions for Excessive Methane:

7. A weekly examination of the entire bleeder system, including bleeder evaluation points, will be conducted at least once every seven days by a certified person designated by the operator. Examinations will include an evaluation of the condition of ventilation controls and air flow direction.

8. Approved bleeder evaluation locations will be clearly indicated at the underground location and a date board will be provided for the examiner to place the date, time, and their initials.

9. The certified person will place the date, time, and their initials in as many locations as necessary to indicate that the entire length of the bleeder system has been examined and on a date board posted at each bleeder evaluation point.

10. Weekly examinations will include a test for methane and oxygen at each approved bleeder evaluation location and at other areas necessary to fully determine that the bleeder system is functioning properly.

11. Weekly examinations will include a measurement of the quantity of air flow at each approved bleeder evaluation location.

12. During examination of the bleeder system, if an increase of 0.5 percent of methane above normal levels or a reduction in the oxygen content below 19.5 percent is detected corrective action will be taken. Such action will include an examination and evaluation of the bleeder system and, if necessary, introduction of additional air flow.

13. Ventilation changes will only be completed with those miners underground necessary to make the change and power to affected units de-energized. Changes to the ventilation system that affect the bleeder system will be approved by the Chief prior to implementation. Ventilation changes are defined as any intentional change in ventilation that:

a) Alters the main air current or any split of the main air current in a manner that could materially affect the safety and/or health of persons in the mine; or

b) Affects section ventilation by 9,000 cubic feet per minute of air or more.

14. Should methane levels exceed 2 percent in any bleeder split immediately before entering another air split, production on active units that utilize the affected bleeder split will immediately cease. The bleeder system will then be examined and evaluated and appropriate corrective action will be taken to reduce methane levels below two percent.

15. Should methane levels greater than 4.5 percent be encountered anywhere in the bleeder system, production on active mining units in the mine will immediately cease, the power shut off, and work will begin immediately to correct the condition. All miners will be withdrawn from the mine except those necessary to correct the condition. Coal Mine Safety will be promptly notified.

Bleeder System Changes:

16. Intentional changes in the ventilation of the bleeder system will be approved by Coal Mine Safety prior to implementation.

17. Approved bleeder system changes will be reviewed with affected personnel prior to implementation, and will be kept on file at the mine site for review by representatives of Coal Mine Safety or other interested parties.

18. Ventilation changes affecting the bleeder system will be completed during idle shifts with the power cut off from the affected area.

19. When changes in the bleeder system are completed, a thorough evaluation of the bleeder system and the ventilation system of the mine will be conducted to verify that air is traveling in the proper direction, quantity of airflow is sufficient, and air quality is acceptable.

Roof and Rib Control:

20. Bleeder entry examinations will include evaluations of the roof and rib conditions in the bleeder system.

21. If hazardous roof or rib conditions are detected, such conditions will be recorded and measures taken to correct the condition. Corrective measures may include the installation of supplemental roof supports and/or dangering-off the affected area and redirecting the route of travel.

22. Sloughing of the ribs, draw rock, etc. that interferes with safe travel or function of the bleeder system will be promptly addressed.

23. Bleeder entries that are designed to be traveled will have a minimum of two rows of un-pillared blocks left in place.

24. Bleeder access rooms or taps that are developed with a single room will be supplemented with a single row of cribs on not more than eight foot centers or equivalent.

Water Accumulations:

25. Water accumulations that interfere with safe travel or function of the bleeder system will be promptly removed by pumping, draining, or substantial bridging constructed.

Unsafe Conditions:

26. Coal Mine Safety will be notified if bleeder entry conditions deteriorate to the extent that travel is considered unsafe.

Seals:

27. In the event that conditions develop that prevent effective ventilation of the bleeder system, all affected areas will be sealed.

28. Seal construction designs approved by the Mine Safety and Health Administration will be utilized. (Such approved construction designs are not required to be submitted to Coal Mine Safety.)

29. Prior to the installation of seals, the type of seal, location, sequence of construction, and a letter signed by a professional engineer certifying the seal construction design at the requested locations will be submitted to and approved by Coal Mine Safety.

30. Coal Mine Safety will be notified at least 24 hours prior to beginning any construction of seals at approved locations. CMS will be notified within seven days after construction of seals is complete.

31. Seals will be constructed and maintained as designed.

32. Sufficient air flow will be utilized to ventilate the face of seals in order to maintain the air quality in compliance with requirements of the *Coal Mine Safety Laws of Virginia*.

33. The atmosphere behind seals rated at less than 120 PSI explosive strength will be sampled weekly and the results recorded in a book maintained at the mine.

Bleeder Map Information:

34. Bleeder system information, including projected and/or installed ventilation controls of the bleeder system and other worked-out areas, will be shown on the annual map submitted to Coal Mine Safety every twelve months. Annual mine maps will meet all requirements of §45.2-542 of the *Coal Mine Safety Laws of Virginia* and include the following additional bleeder information:

a) The existing bleeder system and projected bleeder system information for one year.

b) The locations of all ventilation controls in the bleeder system.

c) The direction of air flow throughout the bleeder system.

d) Approved bleeder evaluation locations.

e) Air quantities at each approved bleeder evaluation location

35. The certified annual map will be accompanied by a letter signed by a responsible individual at the mine stating that the ventilation controls shown are accurate.

36. Overlays and underlays of mine workings will be revised and/or supplemented as required.

37. Approved bleeder evaluation locations (MLs, BEPs, etc.), where the quantity and quality of the bleeder air current is measured, are listed in Attachment A of this plan.

38. Changes in the bleeder system, including the establishment of bleeder evaluation points, will be submitted to and approved by Coal Mine Safety prior to implementation.

39. A mine map will be maintained up-to-date at the mine and will show, at a minimum, the following bleeder system information:

a) The existing bleeder system.

b) The locations of all ventilation controls in the bleeder system. The map will be updated as changes or modifications to ventilation controls are completed.

c) The direction of air flow throughout the bleeder system.

d) Approved bleeder evaluation locations.

De-gasification System

40. This mine does not employ a de-gasification system. If needed, a bleeder supplement will be submitted addressing the type of de-gasification system to be utilized and include such other details as specified by Coal Mine Safety.

Management Control and Training:

41. The person with overall responsibility for health and safety, as identified in the mine license application, is responsible and accountable for the implementation of this Bleeder Plan.

42. The person with overall responsibility for health and safety at the mine will ensure that approved changes in the bleeder system are clearly communicated to all miners.

43. Ventilation changes that affect the bleeder system will be conducted under the direct supervision of a certified first-class underground mine foreman.

44. The person countersigning the weekly examination book will ensure that all records reflect compliance with requirements of this plan and the *Coal Mine Safety Laws of Virginia* and that any hazardous conditions recorded have been promptly corrected.

45. The applicable contents of this plan, including the bleeder system map, will be reviewed with all newly employed miners and annually with weekly examiners and mine foremen.

Records:

46. Records of bleeder system examinations, conditions encountered, and air quantities and quality at bleeder evaluation points will be maintained in a book kept at the mine. These records must be retained for a period of one year.

47. Record books will be available for review by representatives of Coal Mine Safety at all times.

48. A record of the training required under this plan must be maintained at the mine and open for inspection for a period of one year.

Attachment A

Bleeder Performance Evaluation Stations (BEP's)

Emergency Response Plan

Company Name	Mine Name or Number
Date	Mine Index No.

Detailed Description of Mine Location:

The mine is located:

I. Mine Emergency Communications

1. An up-to-date list of emergency contact phone numbers will be posted in a conspicuous location in the mine office. The list, at a minimum, will contain telephone numbers for Coal Mine Safety (CMS), the Mine Safety and Health Administration (MSHA), mine rescue team or teams assigned to the mine, appropriate mine management personnel, pertinent emergency services such as rescue squads and fire departments, local police agencies, and air ambulance.
2. CMS will be contacted promptly (within 15 minutes) after it has been determined that an accident, as defined in §45.2-501 of the *Coal Mine Safety Laws of Virginia*, has occurred.
3. Two independent communication methods from each working section to the surface will be maintained at all times.
4. Portable mine phones or other effective communication devices will be provided and maintained for the communication system at the end of the lifeline in the primary escapeway, at designated self-contained self-rescuer (SCSR) storage locations in the mine, and at all refuge alternatives, unless an approved wireless communication system is installed.
5. A functional test will be performed on all emergency communication devices at least weekly. Results of such tests will be recorded in a book maintained at the mine.

II. List of Next of Kin

1. A list of all employees including their name, phone number, and designated emergency contact with phone number and relationship will be maintained at the mine site.

2. Such information will be obtained upon employment, updated annually, and when personnel changes occur.

III. Waterlines

1. Waterlines will be installed parallel to the entire length of all belt conveyors. Waterlines may be installed in entries adjacent to the belt conveyor entry as long as outlets project into the belt conveyor entry.
2. The location of waterlines and cut-off valves will be noted on a map maintained at the mine.
3. Firefighting outlets will be located at least every 300 feet and denoted by distinctive signs made of reflective material or other equally distinctive reflective indicators that are emphasized in all training exercises and drills.
4. A cut-off valve will be located inby and outby each belt drive installation. Such cut-off valves will be located no closer than 50 feet and no farther than 200 feet of the drive installation.
5. Firefighting outlets will be substantially protected from damage to threads. All firefighting outlets will be tested at least annually to ensure proper operation.
6. At least 500 feet of firefighting hose shall be stored at a strategic location immediately available at each belt drive; except that if the belt is less than 500 feet in length, the fire hose may be equal to the length of the belt. The firefighting hose will be stored in an accessible location away from the drive installation. Water hose and connections will be protected from damage.
7. All firefighting hose connections will be compatible with installed firefighting valves. Nozzles will be compatible with firefighting hose.

IV. Brattices

1. A numbering system beginning one crosscut inby the portal and extending to the loading point on the working sections will identify permanent stoppings installed adjacent to any primary or alternate escapeways.
2. Adequately sized numbers that are readily visible will be located on or at stoppings along the designated primary and alternate escapeways.
3. The location of all mandoors will be clearly marked with reflective signs or materials so that they will be easily identified by anyone traveling in the primary and alternate escapeways and in the entries on either side of the doors.
4. Mandoors will be located at least every fifth crosscut not to exceed 300 feet in seam heights less than 48 inches and 600 feet in seam heights 48 inches or higher.

V. Escapeways

1. An up-to-date map of the entire mine showing designated primary and alternate escapeway routes, outby refuge alternative locations, direction of airflow, stoppings, mandoors, overcasts, regulators, bottom of coal seam contours, and SCSR storage locations will be posted in a conspicuous location on the surface so all miners may be shown and instructed in the use of the primary and alternate escapeway routes.

2. An up-to-date map of the mine will be maintained in a designated location on each working section and areas where mechanized mining equipment is being installed or removed. The map will show the primary and alternate escapeway routes from the section to the surface (or bottom of shaft or slope), direction of airflow, stoppings, man-doors, overcasts, undercasts, regulators, bottom of coal seam contours, SCSR storage locations and outby refuge alternative locations.
3. All miners will be instructed of any changes made in the mine involving the ventilation system and primary and alternate escapeway routes before traveling underground.
4. The designated escapeways will be reviewed with all newly employed miners. Each newly employed miner will travel the entire length of the primary escapeway within seven (7) days of employment.
5. A record of any instruction to miners regarding escapeway locations, changes to escapeway locations, and the ventilation system at the mine will be entered in a record book maintained at the mine.

VI. Lifelines

1. Continuous lifelines will be installed and maintained throughout the entire length of primary and alternate escapeways from the loading point of each working section and from locations where mechanized mining equipment is being installed or removed to the surface or to the bottom of shafts or slopes.
2. Lifelines will be installed and maintained in such a manner as to facilitate safe walking or crawling and with the miners being able to maintain continuous contact with the lifeline.
3. Lifelines will be equipped with directional indicators, signifying the route of escape, placed at intervals not to exceed 100 feet.
4. Lifelines will be identified with reflective material every 25 feet.
5. Lifelines will be provided with directional indicators aligned with mandoors in a stopping line.
6. Lifelines will be provided with indicators to identify locations of SCSR caches. When such caches are not immediately adjacent to the continuous lifeline, a branch lifeline will lead from the escapeway lifeline to the SCSR storage location.
7. A tether line will be stored at the end of the lifeline, in the primary escapeway, on each working section. Each tether line will be long enough to connect all miners normally assigned to that work area.

VII. Detectors

1. A detection instrument capable of determining the amount of oxygen, methane, and carbon monoxide in the mine atmosphere will be provided to each group of underground miners and to each person who works in a remote location. These instruments will remain operational during the miners' time underground.
2. Gas detection instruments will be calibrated at least monthly in accordance with manufacturers' recommendations.

VIII. Refuge Alternatives

1. All underground miners will be provided with post-accident breathable air for a sustained period in a refuge alternative. A refuge alternative(s) will be maintained within 1000 feet of the nearest working face. The outby refuge alternatives will be located in the primary or alternate escapeway not exceeding one (1) hour of walking or crawling time.

2. Refuge alternatives will not be placed within the direct line of sight of the working face. Also, where feasible, refuge alternatives will not be placed in areas directly across from, nor closer than 500 feet radially to belt drives, take-ups, transfer points, air compressors, explosive magazines, seals, entrances to worked out areas, and fuel, oil, or other flammable or combustible material storage. Where there is a conflict between placing the refuge alternative within 1000 feet of the nearest working face and placing the refuge alternative no closer than 500 feet radially from the previously indicated areas, placement within 1000 feet of the nearest working face will take preference.

IX. SCSR Storage

1. Each miner working underground will have at least one additional SCSR (other than the SCSR kept within 25 feet) available on the working section. If miners travel on mantrips or other mobile equipment, then the mantrips will be provided with enough SCSRs to ensure that each miner is supplied one additional SCSR. SCSRs stored on mantrips or mobile equipment, which remains on the section, will suffice for the additional SCSR that must be supplied to each miner.

2. When the SCSRs, otherwise required by paragraph 1, are not adequate to provide enough oxygen for all persons to safely evacuate the mine, additional SCSRs will be provided in the primary and alternate escapeways. The location and number of SCSRs stored will be sufficient for the maximum number of miners in the mine and will be provided at intervals to ensure that each miner has a sufficient supply of SCSRs to reach the surface or bottom of shaft or slope.

3. Storage caches will be provided at conspicuous, readily accessible, safe locations.

4. SCSR storage caches will be established such that the distance between caches is a maximum of 30 minutes of walking or crawling time.

5. SCSR storage caches will be established for both primary and alternate escapeways.

6. Each SCSR storage cache and station for mantrips storing SCSRs will be conspicuously designated and direction signs made of reflective material will be posted in each intersection adjacent to each storage location.

7. SCSR storage caches will be located in protected areas and/or containers according to manufacturers' recommendations.

8. The location of SCSR storage caches will be noted on the mine map, which is maintained on the surface and mine emergency escapeway maps.

9. Each additional stored SCSR will provide one hour or more of protection and will be approved by MSHA. The SCSR kept on a person or within 25 feet may be another shorter duration approved type. If a shorter duration SCSR is worn on the

belt, a second one hour SCSR will be readily available to the miner in addition to the one stored in the section cache.

X. SCSR Training

1. Prior to any newly employed miner or visitor traveling underground, authorization by the operator is required. The operator will instruct and train such persons in the use and location of self-rescue devices. Visitors who make multiple visits within a one-year period are only required to receive such training on the first visit and annually thereafter.

2. The training will include instruction and demonstration in the use, care, and maintenance of the self-rescue devices used at the mine.

3. The training in the use of the self- rescue devices will include complete donning procedures in which:

a. Each person assumes a donning position.

b. Opens the device.

c. Activates the device.

d. Inserts the mouthpiece or expectations training mouthpiece.

e. Applies the nose clip.

f. Transfers from one unit to another.

4. A record of the training will be maintained at the mine with the date of the training, names of persons receiving the training, name of the person conducting the training, and the model of the self-rescue device(s) used in the training.

Xl. Mine Emergency Evacuation and Fire Fighting Training

1. All miners on all shifts will be instructed in the following where applicable:

a. Procedures for evacuating the mine for mine emergencies that presents an imminent danger to miners due to fire, explosion, or gas or water inundation.

b. Scenarios of the various mine emergencies (i.e. fires, explosions, gas or water inundations) and best options for evacuation under each type of emergency condition. These options will include conditions in the mine that will require immediate donning of self-rescue devices.

c. Procedures for evacuating all miners not required for a mine emergency response.

d. Procedures for the rapid assembly and transportation of necessary miners, fire suppression equipment, and rescue apparatus to the scene of the mine emergency.

e. Operation of the fire suppression equipment available in the mine.

f. Location and use of firefighting equipment and materials.

g. Location of escapeways, exits, and routes of travel to the surface, including the location and use of the continuous directional lifeline or equivalent devices.

h. Locations, quantity, types, and use of stored SCSRs.

2. The mine emergency evacuation instruction and drills will be conducted by a person who is designated by the mine operator and who has the ability, training, knowledge, or experience to provide training to miners in their area of expertise. Persons conducting training will be able to effectively train and evaluate whether miners can successfully don the SCSR and transfer to additional SCSR devices.

3. Mine emergency evacuation drills will be held at periods of time to ensure that all miners participate in such evacuations at least quarterly.

4. During mine emergency evacuation drills, each miner shall travel the primary or alternate escapeway, from the working section or the miner's workstation, to the surface or the exits at the bottom of shaft or slope. An evacuation drill will not be conducted in the same escapeway as the immediately preceding drill. At a minimum this drill will include:

    a. Physically locating the continuous directional lifelines or equivalent devices and stored SCSRs.

    b. Hands-on training in the complete donning of all types of SCSRs used at the mine, which includes assuming a donning position, opening the device, activating the device, inserting the mouthpiece or expectations training mouthpiece, and putting on the nose clip.

    c. Hands-on training in transferring between all self-rescue devices used at the mine.

    d. Where miners ride transportation vehicles to travel the escapeway, the person conducting the drill will stop at the locations of SCSR storage caches or other appropriate locations and conduct drills consisting of actual travel on the lifeline and practice with the tether line connected to each miner.

5. A record of the training required in paragraph 4 (listed above) shall be recorded in a book maintained at the mine. The record will be maintained for one (1) year and will include the names of the participants in such drill, models of SCSRs used, and the type of emergency drill.

6. All miners on each working section will be familiar with the use of fire suppression equipment available and fire suppression devices installed on equipment and know the location of such fire suppression equipment and devices.

XII. Evacuation Procedures

1. Account for all miners on the section or located in that work area. Gather all miners at a strategic location.

2. SCSRs should be donned at the first sign of smoke or indication of carbon monoxide. Miners should don a self-rescue device when smoke, odor, fire, or any contaminated atmosphere is encountered. Enough SCSRs will be available to ensure that all miners can safely reach the surface.

3. Prepare to evacuate to the surface:

    a. Collect SCSRs.

    b. Collect the escapeway map, if applicable.

    c. Collect tether line, if applicable.

d. Call outside, if possible, report the number of miners in the group and the evacuation route to be traveled.

e. Explain to the miners what is known about the emergency situation and which route is to be taken.

f. Stress the importance of staying together during the evacuation.

4. Travel by mantrip or utilize other equipment for transportation if at all possible.

5. Select the safest and quickest route to the surface depending on the conditions that exist in the mine:

a. The first choice is generally the travel way used normally to enter and exit the mine (usually this is the primary or alternate escapeway).

b. The second choice is generally the other escapeway not used normally to enter and exit the mine.

c. The third choice would be any other entry not discussed above.

6. If walking or crawling, regulate travel speed to accommodate the slower personnel in the group. Maintain contact with the lifeline, if applicable. Stay together. Monitor the physical conditions of other miners in the group.

7. Continuously monitor the mine atmosphere for oxygen deficiency, methane content, and elevated carbon monoxide levels. Keep in mind that:

a. 19.5 percent oxygen is the minimum required by law. Oxygen levels below 17 percent cause faster and deeper breathing and below 15 percent cause dizziness, buzzing noise, rapid pulse, headache, and blurred vision.

b. Methane is explosive from 5 percent to 15 percent.

c. Carbon monoxide levels above 600 PPM will give noticeable effects after one hour of exposure, and levels above 1500 PPM are dangerous for a one-hour exposure.

8. Contact the surface when communication is available. Give regular updates of location, conditions encountered, status of miners, and transportation means being utilized.

9. When SCSR storage caches are encountered, collect one for each miner in the group. Do not take more, as miners evacuating from other areas of the mine may also require SCSRs to reach the surface. SCSR storage caches are strategically located in order to provide sufficient oxygen for all miners to reach the surface.

10. Continue traveling the selected route unless the way is blocked by water, fire, or other conditions. In this case, retreat to the closest mandoor that leads to other escapeways and attempt to travel to the surface via other routes.

11. If traveling in smoke, maintain contact with the lifeline, attach tether line if available, and maintain communication with other miners. Check through mandoors on the evacuation route for smoke in the adjacent entries and, if clear, the miners should consider utilizing the alternate route.

XIII. Emergency Logistics (Complete with Mine Specific Information)

1. The following plans for logistics in case of an emergency will be maintained at the mine site. The plans will include at a minimum:

a. Description of security measures that will be implemented to control emergencies at the mine site.

b. Designated location of a command and communication center.

c. Designated location for staging and briefing mine rescue teams.

d. Designated location for emergency medical services.

e. Designated location and coordinates of nearest landing pad meeting air ambulance specifications

f. Designated location for shelter and briefing of families.

g. Strategy for dissemination of information and press releases.

XIV. Mine Emergency Response Drill

1. A Mine Emergency Response Drill (MERD) will be conducted at least once every 12 months, preferably in conjunction with a quarterly mine emergency evacuation drill or at other times selected by the operator.

2. The drill will consist of:

a. A simulated mine emergency that causes a deployment (simulated) of mine rescue teams.

b. Simulated entrapment of miners in the mine.

c. A review of notification procedures required by this plan.

d. Review and simulation of activation of the Emergency Logistics Plan described in the previous section.

3. CMS will be notified at least three (3) days prior to conducting the MERD. A CMS representative may monitor the simulated drill and give feedback regarding application of the pertinent aspects of this plan.

XV. Emergency Injury Trauma Response

1. Injury trauma response supplies and equipment will be maintained in a single designated location on each working section and areas where mechanized mining units are being installed or removed.

2. Injury trauma response supplies will be stored on mobile equipment, either self-propelled or a suitable service trailer, and readily available for transport to an accident scene.

3. Emergency injury trauma response supplies stored on sections, at a minimum, will include the following:

a. Full complement of required basic first aid and advanced first aid supplies and materials as required by law and regulation.

b. An x-ray translucent, air ambulance compatible backboard.

c. An approved portable oxygen administration unit.

d. An approved Automatic Electric Defibrillation Unit.

e. At least two lifting devices (as described in §45.2-714) with a combined total of at least 80 tons lifting capacity. Each individual lifting device shall have 20 tons or greater lifting capacity.

f. A lifting bar, sledge hammer, and chains (or suitably strong rope).

4. A method will be provided and readily available for safely transporting a patient and, if mine conditions allow, designed to accommodate the responder administering treatment including administration of CPR.

5. The location of emergency injury trauma response equipment shall be clearly marked by reflective signs from the loading point to the location of storage.

6. Emergency injury trauma response will be incorporated into mine emergency response drills provided in Section XIV of this plan.

SMOKER SEARCH PROGRAM

Company Name	Mine Name or Number
Date	Mine Index Number

No miner or other person shall smoke, carry or possess underground any smoker's articles or matches, lighters or similar materials generally used for igniting smoker's articles. This smoker search program, as required by §45.2-856 of the *Coal Mine Safety Laws of Virginia*, establishes procedures to be followed in conducting regular searches of personnel entering the mine.

1. Searches will be conducted at least once per calendar week by an authorized person.
2. Searches will be conducted on all shifts, at staggered intervals, and at various locations on employees prior to entering the mine. Random underground searches will be conducted on all crews at least monthly.
3. Searches will include but not be limited to: checking inside hard hats, pockets, boots, lunch boxes, gloves, etc.
4. At least one employee will assist in conducting the smoker's search. This employee will conduct a search on the individual who carries out the smoker's search for the company if that individual enters the mine.
5. A record of the results of these searches will be maintained at the mine site for a period of one year and signed by the person conducting the search.
6. This plan will be reviewed with all employees in order to familiarize them with the above procedures.

Company Official

FAN STOPPAGE PLAN

.	.
Company Name	Mine Name or Number
.	.
Date	Mine Index Number

In the event of a ventilation interruption resulting from the failure of a mine fan, the following plan, as required by §45.2-834 of the *Coal Mine Safety Laws of Virginia*, will be followed:

1. All persons will immediately be withdrawn from the face area of the working sections.

2. Electrical power will immediately be de-energized in all face areas.

3. If ventilation is restored within 15 minutes, all active working places and other areas where methane is likely to accumulate will be examined by a certified person. If air is coursing in the proper direction, methane is not detected in quantities of 1 percent of volume or more and the areas are determined safe, the electrical power will be restored and work resumed.

4. If ventilation cannot be restored within 15 minutes, the mine electrical power will be de-energized and all persons will be withdrawn from the mine and transported by the most direct route to the surface.

5. All diesel powered equipment underground will be shut down except equipment used in transportation of personnel to the surface during the evacuation of the mine.

6. A certified person will place a suitable danger signal at the mine entrance to prevent unauthorized entry after all personnel have been evacuated.

7. The maximum fan operation time for this mine has been established at **60 minutes** for a ventilation interruption due to a failure of a mine fan.

8. If ventilation is interrupted for a period exceeding 15 minutes, the mine fan must be operated at normal ventilation pressure for the period of time that the fan was inoperative, up to the maximum time established above, before a certified person may re-enter the mine to begin required examinations.

9. Once ventilation has been restored and the mine fan has operated at normal water gauge and normal methane levels for a period of time indicated above, a systematic examination, as specified in §45.2-826 of the *Coal Mine Safety Laws of Virginia*, will be conducted by a certified person or persons.

10. If oxygen deficient air and/or excessive methane levels are detected, the examiner will stop and take appropriate corrective actions to improve the air or retreat to the surface.

11. After the mine has been examined and reported safe, the danger signal located at the mine entrance may be removed, miners will be permitted underground, and power circuits may be re-energized.

12. The approved fan stoppage plan will be reviewed in detail with all mine personnel and a copy of the plan will be maintained at the mine for review at any time by appropriate personnel.

_____

Company Official

Company Name: _____

Mine Name: _____ Mine Index No. _____

Date: _____

Substance Abuse Screening Policy and Program

Purpose

This Company is committed to provide and maintain a safe and productive work environment free from the adverse effects of drugs and alcohol. The Company will provide support to the workforce in opposing the use of illegal drugs, alcohol, and/or the misuse of prescription medications and over-the-counter medications. As a condition of employment, employees will abide by the following Policy terms:

Policy

1. The use, consumption, possession, sale, and distribution or transfer of drugs; and the possession of paraphernalia containing the residue of drugs by an employee on Company property or on Company business is prohibited.
2. Employees are prohibited from working under the influence of drugs or alcohol. Employees are required to report to work in a condition that allows them to work safely and efficiently.
3. Any employee under medical care that requires them to take a pain killer, a classified schedule III drug, or any drug that carries a warning label to exercise care when operating heavy machinery or driving, must provide the Company with a copy of the prescription and a letter from his or her doctor certifying that the drug will not impair their mental and/or physical ability that is required for the performance of their job.
4. Notwithstanding the above, the Company reserves the right at any time to suspend an employee from work while taking any prescription drug that may impair their job performance.

Scope of Application

This Policy applies to all Company employees and all contractor employees.

Exceptions

The use of prescription drugs in a manner approved by the employee's physician with the assurance that such usage will not impair safe job performance is not prohibited.

Testing

All newly employed miners will be required to submit to a pre-employment drug screening. Such screening will consist of, at a minimum, a 10-panel urine test to be performed for the following substances:

1. Amphetamines,
2. Cannabinoids/THC,
3. Cocaine,
4. Opiates,
5. Phencyclidine (PCP),
6. Benzodiazepines,
7. Propoxyphene,
8. Methadone,
9. Barbiturates, and
10. Synthetic narcotics

Samples will be collected by providers who are certified as complying with standards and procedures set out in the United States Department of Transportation's rule -- 49 CFR Part 40. Collected samples will be tested by laboratories certified by the United States Department of Health and Human Services, Substance Abuse and Mental Health Services Administration (SAMHSA).

Screenings May Also Be Required When:

1. The Company has a reasonable suspicion that an employee has violated the Substance Abuse Policy.
2. An employee who works in a safety-sensitive environment and is involved in an on-the-job accident, as described herein. The Company may, in its exclusive discretion, waive the drug and/or alcohol test requirement of an accident victim.

Reasonable suspicion may be determined by an employee's performance, appearance, or conduct drawn from specific facts as observed by the Company, including but not limited to, exhibiting unusual behavior on the job or a questionable pattern of absences. The Company will, in its sole discretion, determine the existence of such reasonable suspicions.

Coal Mine Safety (CMS) will be notified within seven (7) days of any of the following events:

1. Failure of any pre-employment substance abuse screening tests.

2. Discharging a miner due to violation(s) of the Company's substance or alcohol abuse policies.
3. A miner testing positive for intoxication while on duty status.
4. A miner testing positive for using any controlled substance without the prescription of a licensed prescriber and failing to complete the Operator's Substance Abuse Program.

Notices submitted to CMS may result in the immediate suspension of all certificates held by the applicant, pending a hearing before the Board of Coal Mine Examiners.

Accidents include:

1. On-the-job incidents in which the employee or another individual suffers injuries requiring medical attention or in which substantial damage to property or equipment occurs.
2. Incidents of so-called "near misses" which do not result in either physical injury or substantial equipment or property damage but could have potentially done so.
3. Employees operating Company vehicles will be subject to testing in any event when they have been cited for a moving violation.

Management, at its exclusive initiative, may conduct random drug and alcohol testing. The random testing pool will include any employee who works in a safety-sensitive environment. Employees will be tested on a randomly selected basis; in that, when random testing takes place, all employees that are randomly selected will be tested.

An employee who is being tested must sign an appropriate form or forms to authorize the testing and to release the results thereof to the Company. A refusal to sign such forms will be considered a violation of the Policy and the employee will be subject to discipline up to and including termination.

In the event that the test results are negative, no further action will be taken. If the test results are positive, the appropriate disciplinary action will be taken, which may include termination of employment.

Disciplinary Action

Employees found to be in violation of any part of this Policy, including a refusal to submit to a test, a search, or sign a required consent form, as provided for herein, will be subject to termination of employment on grounds of gross misconduct. Additionally, any employee convicted of violating a criminal drug statue, or who alters or attempts to alter the results of a drug or alcohol test will also be subject to disciplinary action, up to and including termination.

Searches

As a condition of employment, an employee's person may be searched if the Company has reasonable suspicion that the employee has violated this Policy. Further, an employee's locker, lunch box, tool box, or any container or vehicle used to transport objects on Company premises may be searched. By reporting to work, each employee shows his or her agreement to this Policy. Consequently, no employee should have any expectation of privacy in his or her locker, lunch box, tool box, or any container or vehicle used to transport objects on Company premises. Refusal to permit such a search is a violation of this Policy and the employee will be subject to discipline, up to and including termination.

Voluntary Rehabilitation

It remains the Company's desire and intent to encourage any employee with a drug or alcohol abuse and/or dependence problem to seek professional assistance before an employee is subject to testing and the problem leads to an incident requiring disciplinary action. If an employee does not seek professional assistance before testing under this Policy or an incident requiring disciplinary action occurs, Voluntary Rehabilitation under this Policy will not be available to that employee.

Any employee who voluntarily reports a drug or alcohol abuse problem to the Company will be permitted to take personal leave in order to obtain substance abuse counseling. This leave is conditioned upon the employee actually enrolling in a rehabilitation program approved in advance by the Company.

The employee must pass a Company authorized drug or alcohol screen within 30 days from the last day worked or be terminated. If the employee passes the drug or alcohol screen within 30 days, he or she will be eligible to return to work, provided that there is an opening available for a job that the employee is qualified to perform. The employee will be subject to drug or alcohol screens without notice for the next 12 months as a condition for returning to work. If the employee fails any drug or alcohol screen, refuses to permit a required search, fails to sign a required consent form, alters or attempts to alter the results of a drug or alcohol test, or otherwise fails to successfully complete the rehabilitation program, he or she will be terminated.

This Policy does not require the Company to provide or pay for substance counseling or treatment beyond the level of benefits outlined in the Company's benefits plan summary descriptions.

Evidence

Any evidence obtained by the Company of the unlawful use, consumption, possession, sale, distribution, or transfer of mind or behavior altering drugs or alcohol may be turned over to local or state law enforcement agencies for appropriate action.

The following cutoff levels will be used when negative for these drugs or metabolites and alcohol. All levels equal to or exceeding the following will be reported as positive:

DRUG CLASS	SCREEN	GC/MS
Amphetamines	1000 ng/ml	500 ng/ml
Barbiturates	300 ng/ml	150 ng/ml
Benzodiazepines	300 ng/ml	150 ng/ml
Marijuana Metabolites	50 ng/ml	15 ng/ml
Cocaine Metabolites	300 ng/ml	150 ng/ml
Methadone	300 ng/ml	150 ng/ml
Opiates		
Codeine	300 ng/ml	100 ng/ml
Morphine	300 ng/ml	100 ng/ml
Hydrocodone	300 ng/ml	100 ng/ml
Hydromorphone	300 ng/ml	100 ng/ml
Oxycodone	100 ng/ml	100 ng/ml
OxyContin	300 ng/ml	100 ng/ml
Propoxyphene	300 ng/ml	150 ng/ml
Phencyclidine	25 ng/ml	25 ng/ml
Alcohol	.02% blood (grams per deciliter)	.02% blood (grams per deciliter)

PUSHING CARS PLAN

Company Name	Mine Name or Number
Date	Mine Index Number

Permission is requested to push cars per §45.2-753 of the Coal Mine Safety Laws of Virginia. The following precautions will be followed when pushing cars:

1. The locomotive will be operated by an authorized person.
2. Two safety chains, wire ropes or other equivalent material of adequate strength and design will be installed between the locomotive and car and between the cars when pushed.
3. A trip light or other warning device will be placed on the end of the car furthest from the locomotive.
4. The number of cars pushed will be limited to the capacity rated by the manufacturer of the locomotive.
5. No other rail equipment will be allowed to operate inby the approaching trip.
6. Mantrips shall be operated independently of any supply trip.
7. The working section or sections will be notified of the approaching trip.
8. This plan will be reviewed with all mine personnel and a copy of the plan will be maintained at the mine for review by appropriate parties.

Company Official

SECTION 15—30 CFR LEGAL REQUIREMENTS

The Code of Federal Regulations (30 CFR) Legal Requirements sets forth safety standards for each underground and surface coal mine subject to the Federal Mine Safety and Health Act of 1977.

The certified First Class Mine Foreman applicant shall have knowledge of the requirements of 30 CFR. This guide contains the requirements of 30 CFR Part 75 to assist an applicant in preparing for the Virginia First Class Mine Foreman's examination.

1. Q. What is the minimum size bearing plate used directly against the mine roof?
   A. 6 inches square or the equivalent.
   30 CFR §75.204 (c) (2)

2. Q. When wooden materials are used between the bearing plate and the mine roof, when must the wood be treated to prevent deterioration?
   A. When installed in areas which will exist for three or more years.
   30 CFR §75.204 (c)

3. Q. What is the minimum depth and spacing intervals that test holes must be drilled?
   A. At least 12 inches above the anchorage horizon of mechanically anchored tensioned bolts being used. Spacing intervals as specified in the roof control plan
   30 CFR §75.204 (f) (2)

4. Q. What is the minimum diameter of round post timbers used to support a roof which is 60 inches or less in length?
   A. 4 inches.
   30 CFR §75.206 (b) (1)

5. Q. What shall be posted at the end of permanent roof support?
   A. A readily visible warning sign or physical barrier to prevent entry.
   30 CFR §75.208

6. Q. Except for the main tram controls, tram controls (inch tram) for positioning the equipment to set the ATRS system, shall have a maximum speed of how many feet per minute?
   A. 80 feet per minute.
   30 CFR §75.209 (e) (4)

7. Q. What must be done when a hazardous roof, face, or rib condition is detected?
   A. The condition shall be corrected before there is any other work or travel in the affected area. If the affected area is to be left unattended then a visible warning sign or physical barrier shall be installed.
   30 CFR §75.211 (c)

8. Q. How shall unsupported openings at intersections be supported?
   A. Permanently supported or one row of temporary supports installed on not more than 5 foot centers prior to work or travel in the intersection.
   30 CFR §75.222 (e)

9. Q. When used for suspending roof to stronger strata, what is the minimum tension length in which roof bolts are required to anchor in stronger strata?
   A. 12 inches.

30 CFR §75.204 (f) (1)

10. Q. How often shall each main mine fan and its associated components be examined for operation?
    A. At least once each day that the fan is operated by a trained person designated by the operator.

30 CFR §75.312 (a)

11. Q. Main mine fans shall be:
    A. Installed in an incombustible housing and have explosion doors, equipped with an automatic signal device to give an alarm when the fans slows or stops and equipped with a pressure recording device.

30 CFR §75.310 (a)(2)

12. Q. If a main fan stops while anyone is underground and ventilation is **NOT** restored within 15 minutes:
    A. Everyone shall be withdrawn from the mine, de-energize all underground electric power except equipment necessary to withdraw persons from the mine.

30 CFR §75.313 (c)(1&2)

13. Q. If a main mine fan stops while anyone is underground, what action is required if fans stops for less than 15 minutes?
    A. De-energize electric equipment at each working section, withdraw persons from working section. A certified person shall examine all working places and other areas where methane may accumulate.

30 CFR §75.313 (a)

14. Q. The air quantity required by the Code of Federal Regulations that must be provided to each working face where coal is being cut, mined, drilled for blasting or loading is:
    A. 3000 CFM

30 CFR §75.325 (a) (1)

15. Q. What is an intentional change in ventilation defined as?
    A. A change which could materially affect the safety or health of persons in the mine or affects section ventilation by 9,00 cubic feet per minute.

30 CFR §75.324 (a) (2)

16. Q. Unless otherwise approved in the ventilation plan, what is the distance ventilation control devices are required to be installed from the area of deepest penetration?
    A. 10 feet.

30 CFR §75.330 (b) (2)

17. Q. In exhausting face ventilation systems, the mean entry air velocity shall be:
    A. 60 feet per minute reaching each working face where coal is being cut, mined, loaded, or drilled for blasting at the inby end of the line curtain.

30 CFR §75.326

18. Q. Methane monitors are required to give warning signals and automatically de-energize equipment when methane reaches a certain percentage:

A. Warning signal at 1% methane and de-energize the machine at 2% methane

30 CFR §75.342 (b) (c)

19. Q. MSHA approved methane monitors shall be installed on:

A. All face cutting machines , continuous miners, longwall face equipment, loading machines and other mechanized equipment used to extract or load coal.

30 CFR §75.342 (a) (1)

20. Q. Pre-shift Examination: When are Pre-shift Examinations required to be conducted?

A. Within three (3) hours preceding the beginning of any eight (8) hour interval when any person is scheduled to work or travel underground.

30 CFR §75.360 (a) (1)

21. Q. Pre-shift Examination: Who is allowed to enter or remain in any underground area unless a Pre-shift Examination has been completed for any established eight (8) hour interval?

A. No person other than Certified Examiners (Mine Foremen)

30 CFR§75.360 (a) (1)

22. Q. Pre-shift Examination: Pumpers may be required to enter or work in underground areas where Pre-shift Examinations have not been conducted. What is required for these pumpers?

A. (i) The pumper must be certified as a Mine Foreman / Pre-shift Examiner; and (ii) the pumper must complete a Pre-shift Examination of his/her travel and work area before performing any other work

30 CFR §75.360 (a) (2)

23. Q. Pre-shift Examination: What shall an Examiner (Mine Foreman) check and verify while conducting a Pre-shift Examination?

A. **(i)** Examine for "Hazardous Conditions" and "Violations" of the nine (9) Mandatory Safety and Health Standards; **(ii)** test for methane and oxygen deficiency; and **(iii)** determine if air is moving in the proper direction and in sufficient volume in each split

30 CFR §75.360 (a and b)

24. Q. Pre-shift Examination: What locations are required to be examined during a Pre-shift Examination?

A. **(i)** Roadways, travel ways and track haulage ways where persons are scheduled to work or travel during the oncoming shift.

(ii) Belt conveyors used to transport persons AND the entries with operating belt conveyors.

(iii) Working sections and areas where mechanized mining equipment is being installed or removed (examination shall include checking working places, ventilation controls, approaches to worked-out areas - includes testing of the roof, face, and ribs.

(iv) Approaches to worked-out areas along intake air courses when such air is used to ventilate working sections and or other areas where anyone is scheduled to work or travel.

(v) Seals along intake air courses where intake air passes by a seal and is used to ventilate a working section(s) where miners are scheduled to work,

(vi) Entries and rooms driven off intake entries more than 20 feet without a crosscut OR two (2) crosscuts without permanent ventilation controls.

(vii) High spots along intake air courses where methane may accumulate, if equipment will be operated in the area.

(viii) Underground electrical installations (transformers, battery chargers, substations, rectifiers, pumps, etc.) if equipment will be energized during the shift.

(ix) Other areas work or travel during the oncoming shift is scheduled, prior to the beginning of the shift.

(x) Refuge Alternatives - RA - (Life Shelters): A Pre-shift Examination of an RA shall consist of: (i) Check for physical damage; (ii) Check integrity of the tamper-proof seal; (iii) Check the mechanisms required to deploy the RA; and (iv) Ready availability of compressed oxygen and air

30 CFR §75.360 (**b and c**)

25. Q. Pre-shift Examination: Where shall a Pre-shift Examiner determine the volume of air entering where personnel are scheduled to work during the oncoming shift?

A. **(i)** Last open crosscut for each working section and areas where mechanized mining equipment is being installed or removed.
(ii) Intake entries immediately out by the face of longwalls.
(iii) Intake end of any pillar line.
(iv) Air Velocity - required to be measured near each end of face of a longwall and other locations as specified in the mine ventilation plan.

30 CFR §75.360 (c)

26. Q. Pre-shift Examination: What locations shall a Pre-shift Examiner certify with initials, date and time that a Pre-shift Examination has been completed?

A. (i) At each working place examined
(ii) Out by working section areas - at enough locations to verify the entire area has been examined .

30 CFR §75.360 (f)

27. Q. A Record of **Pre-shift Examinations** is required to be made on the surface by the Certified Examiner or an Authorized Person designated by the Mine Operator. When shall this record be made?

A. On the surface before any person enters any underground area of the mine.

30 CFR §75.360 (g)

28 .Q. Pre-shift Examination: If a Pre-shift Examination is recorded on the surface by other than the examiner, what action shall the Pre-shift Examiner take upon arrival on the surface?

A. The Examiner shall verify the record with his initials and date by or at the end of the shift.

30 CFR §75.360 (g)

29. Q. How shall the results of methane tests be recorded?

A -By the "actual percentage" of methane measured.

30. Q. When and who shall Countersign mine examination record books, including Pre-shift, On-shift, Weekly and Supplemental?

A. **(i)** MSHA 30 CFR Part 75 requires Countersigning by the Mine Foreman or Equivalent Mine Official by the end of that person's next regularly scheduled working shift.
(ii) NOTE: Coal Mine Safety Laws of Virginia (§45.2-830.F.) - requires Countersigning by the Examiner's Supervisor. A mine operator may authorize another person with equivalent authority of the Examiner's Supervisor to Countersign during the temporary absence of the Examiner's Supervisor.

30 CFR §75.364 (h)

31. Q. Where and how long shall Mine Examination Record Books be maintained at the mine?

A. At a surface location for one (1) year

32. Q. Where is a **Supplemental Examination** required to be conducted?

A. Any area of the mine where persons may enter and a Pre-shift Examination has NOT previously been conducted for that shift

30 CFR §75.361 (a) (1)

33. Q. How often shall Mine Operators review Citations and Orders issued in areas where Pre-shift, On-shift, Supplemental and Weekly Examinations have been conducted?

A - Once each quarter

30 CFR §75.363 (e)

34. Q. While conducting a **Supplemental Examination,** what shall a Certified Person (Mine Foreman) examine the mine for?

A - Hazardous Conditions and Violations of the nine (9) Mandatory Safety and Health Standards; determine whether the air is traveling in its proper direction and at normal volume AND test for methane and oxygen deficiency

30 CFR §75.361 (a) (1)

35. Q. Supplemental Examination: While conducting a Supplemental Examination, how shall a Certified Person (Mine Foreman) certify that an applicable area has been examined?

A. **(i)** At each working place examined - the examiner shall certify by initials, date, and time
(ii) For areas out by a working section - the examiner shall certify by initials, date, and time at enough locations to show that the entire area has been examined.

30 CFR §75.361 (b)

36. Q. Where are **On-shift Examinations** required to be conducted?

A. **(i)** On sections where anyone is assigned to work.
(ii) Locations where mechanized mining equipment is being installed or removed.
(iii) Along belt conveyor haulage ways on any shift when a belt conveyor is operated.
(iv) Examinations for compliance with Respirable Dust Control Parameters.

30 CFR §75.362 (a) (1 and 2)

37. Q. On-shift Examination: Compliance examination of Respirable Dust Control Parameters: What shall be recorded for this examination?

A. The Results and Corrective Action Taken.

30 CFR §75.362 (a) (2)

38. Q. When shall a Compliance Examination of **Respirable Dust Control Parameters** be conducted?

A. **(i)** Interruption in production - before "production" begins
(ii) No interruption in production (hot seating) - within one (1) hour after shift change

30 CFR §75.362 (a) (2)

39. Q. On-shift Examination: Respirable Dust Control Parameters: What are the two (2) record requirements for a Certified Person directing an On-shift Examination of Dust Control Parameters?

A. **(i)** Certify with initials, date and time on a board maintained at the section load-out or similar location showing the examination was made prior to production.
(ii) Verify with initials, date and time in a record book maintained on the surface - this record shall be made no later than the end of the shift for which the examination was made.

30 CFR §75.362 (g)

40. Q. When conducting an **On-shift Examination,** where shall a Certified Person (Mine Foreman) measure the volume of air?

A. **(i)** Last open crosscut for each working section.
(ii) Last open crosscut where mechanized mining equipment is being installed or removed.
(iii) Intake entries immediately out by the face of long wall(s) - includes where installing or removing long wall equipment.

(iv) Intake end of pillar line.
(v) Velocity of air - required to be determined at each end of face on longwalls at locations specified in the mine ventilation plan

30 CFR §75.362 (c)

41. Q. On-shift Examination: When shall a "Qualified Person" conduct methane tests?
A. (i) At or in each working place at the start of the shift.
(ii) Before electrical equipment is energized OR taken into OR operated in a working place.
(iii) At 20 minute intervals during the operation of equipment in working places -OR- more often, if required in the mine ventilation plan.
(iv) At the shearer, plow or cutting head of longwall machines.

30 CFR §75.362 (d)

42. Q. Where and how shall methane tests be conducted at "working faces"?
A. From under permanent roof support, using extendable probes if necessary to remain under permanent roof support.

30 CFR §45.360 (d) (2)

43. Q. **On-shift Examination**: How often shall methane tests be conducted in each return split of air from each working section and long wall where coal is being produced?
A. At intervals NOT exceeding four (4) hours - AMS may be used in lieu of four (4) Immediate Return methane tests.

30 CFR §75.362 (f)

44. Q. When conducting mine examinations under **30 CFR Subpart D - VENTILATION**, what are the requirements for any Hazardous Condition found by the Mine Foreman or other person certified as a Mine Foreman?
A. **(i)** Any Hazardous Condition shall be "POSTED" with a conspicuous "DANGER SIGN" where anyone entering the area(s) would pass.
(ii) Any Hazardous Condition shall be CORRECTED IMMEDIATELY or the area shall remain Posted until the condition is corrected; only persons designated by the Mine Operator to Correct or Evaluate a Hazardous Condition may enter a Posted Area.
(iii) Any Hazardous Condition that creates an Imminent Danger requires everyone except those persons referred to in Section 104 of the Act shall be Withdrawn from the affected area to a safe area until the condition is corrected.
(iv) Any Hazardous Condition or Violation of the nine (9) Mandatory Safety and Health Standards found during a Pre-shift, Supplemental, On-shift or Weekly Examination SHALL be CORRECTED and a RECORD of these Hazardous Conditions and Violations shall include the Nature, Location and Corrective Action Taken

45. Q. **Weekly examination** of worked-out areas (every seven (7) days: A Certified Person (Mine Foreman) shall examine "unsealed, worked-out areas" where no pillars have been recovered. What is required by an Examiner to conduct a Weekly Examination in these areas?
A. **(i)** Travel to the area of deepest penetration.
(ii) Test for methane and oxygen deficiency.
(iii) Measure air quantity where air enters and leaves the worked out area.

30 CFR §75.364 (a)

46. Q. Weekly Examination of "Bleeder Systems" as required by §75.334:
What is required to conduct an evaluation (examination) of a "Bleeder System" during a Weekly Examination?
A. **(i)** Travel in its Entirety - at least one entry of each set of "bleeder entries" used as part of a bleeder system as specified in §75.334.

(ii) Conduct methane and oxygen tests.
(iii) Measure air quantity and a test to determine if air is moving in the proper direction at locations specified in the ventilation plan to determine effectiveness of the bleeder system.

30 CFR §75.364

47. Q. **Weekly Examination:** At least every seven (7) days, a Certified Person (Mine Foreman) shall make examinations for Hazardous Conditions and the nine (9) Violations of Mandatory Safety and Health Standards. Where shall these examinations be made?

A. **(i)** One entry of each intake air course in its entirety.
(ii) One entry of each return air course in its entirety.
(iii) Each longwall travel way in its entirety.
(iv) Each escapeway in its entirety.
(v) Each working section Not Examined under 75.360 during the previous seven (7) days.
(vi) Each water pump area Not Examined during a Pre-shift Examination conducted during the previous seven (7) days.
(vii) Each seal along return and bleeder air courses AND at each seal along intake air courses Not Examined during Pre-shift examination.

30 CFR §75.360 (b) 5

48. Q. Weekly Examination: A Certified Person (Mine Foreman) shall conduct specific air measurements and methane tests. What does this part of a Weekly Examination consist of?

A - **(i)** Determine the **volume of air** entering the main intakes and main returns.
(ii) Determine the volume of air and test for methane in the last open crosscut AND in the return of each split immediately before it enters the main returns AND where the air leaves the main returns.
(iii) Test for methane in the return entry nearest each set of seals immediately after the air passes the seals (**NOTE**: Outby the last seal in a set of seals)

30 CFR §75.364 (c)

49. Q. **Weekly Examination:** What are other areas/factors associated with conducting Weekly Examinations?

A . **(i)** A Weekly Examination may be conducted at the same time as a Pre-shift or On-shift examination.
(ii) A Weekly Examination is NOT required during any seven (7) day period in which No One enters the mine.
(iii) A person making Weekly Examinations shall certify by Initials, Date, and Time at enough locations to show the entire area has been examined.

30 CFR §75.364 (c) (f) and (g)

50. Q. **Weekly Examination:** At the completion of any shift during which a portion of a Weekly Examination is conducted, what results shall be recorded?

A . **(i)** A record of Hazardous Conditions and Violations of the nine (9) Mandatory Health or Safety Standards.
(ii) Location of Hazardous Conditions and Violations of Mandatory Safety and Health Standards.
(iii) Corrective Action taken for (**i** and **ii** above).
(iv) Results and location of air and methane measurements.

30 CFR §75.364 (h)

51. Q. **Weekly Examination:** A Weekly Record shall be made by the Person making the examination OR an Authorized Person designated by the mine operator.
What is required by a Weekly Examiner when a Person other than the Examiner **records** Weekly Examination Results?

A. The Examiner shall verify the Record (in the Record Book on the Surface) with their initials and date by or at the end of the shift for which the examination was made.

30 CFR §75.364 (h)

52. Q. Who shall **"**Countersign" a Weekly Examination Record Book?

A. The Mine Foreman or Equivalent Mine Official by the end of the Mine Foreman's next regularly scheduled working shift.

30 CFR 7§5.364 (h)

53. Q. What type of rock dust should be used?

A. Dust with a low free-silica content.

30 CFR §75.2

54. Q. What is the maximum percentage of silica allowed in rock dust?

A. A maximum of five percent.

30 CFR §75.2

55. Q. What shall be the size of rock dust?

A. All will pass through a 20-mesh screen and not less than 70 percent will pass through a 200-mesh screen.

30 CFR §75.2

56. Q. What are the largest-size particles of coal dust that could start an explosion?

A**.** Particles of coal dust that will pass through 20-mesh screen.

30 CFR §75.400.1

57. Q. Which type coal dust is sufficient to propagate a coal dust explosion?

A. Float coal dust suspended in the air.

30 CFR §75.401.1

58. Q. Will damp coal dust explode?

A. Yes. Dampness causes the dust particles to cohere, and greater force is required to separate and raise into suspension. Once in suspension, if ignited, damp coal dust will explode.

30 CFR §75.401-402.1; §75.402.2

59. Q. What does the term "too wet" mean as related to coal dust?

A. That sufficient natural moisture is retained by the dust that moisture is exuded when squeezed.

30 CFR §75.402.1

60. Q. After applications of rock dust are made in a coal mine, how may the incombustible content of the mine be determined?

A. By collecting samples of dust from the sides, roof and floor and analyzing them for total incombustibility with a device known as a "volumenometer," or by proximate analysis.

30 CFR §75.403

61. Q. What shall be the minimum percentage of incombustible material after rock dust has been applied in intake aircourses?

A. 80 % except where methane is present then the incombustible content is increased by 0.4% for each 0.1% of methane.

30 CFR §75.403

62. Q. What is the principal explosion hazard in tipples?
A. Accumulations of coal dust.

30 CFR §75.202

63. Q. The incombustible content of combined coal dust and rock dust in return air courses shall not be less than:
A. 80 % except where methane is present then the incombustible content is increased by 0.4% for each 0.1% of methane.

30 CFR §75.403

64. Q. Rock dust required applications are:
A. Not required to be applied on areas that are too wet or too high in incombustible content to propagate an explosion and all crosscuts less than 40 feet from a working face. Where rock dust is required to be applied, it shall be distributed upon the roof, floor and ribs of all underground areas of the mine.

30 CFR §75.403

SECTION 16 – DEFINITIONS

Accident – (i) a death of an individual at a mine: (ii) a serious personal injury or an injury that has a reasonable potential to cause death (iii) an entrapment of an individual for more than thirty minutes; (iv) an unplanned inundation of a mine by liquid or gas; (v) an unplanned ignition or explosion of gas or dust; (vi) an unplanned fire underground not extinguished within ten minutes of discovery and if not extinguished within thirty minutes of discovery at a surface mine and the surface area of an underground mine (MSHA) (vii) an unplanned ignition or explosion of a blasting agent or an explosive; (viii) an unplanned roof fall at or above the anchorage zone in active workings where roof bolts are in use; or an unplanned roof or rib fall in active workings that impairs ventilation or impedes passage (ix) a coal or rock outburst that causes withdrawal of miners or which disrupts regular mining activity for more than one hour; (x) an unstable condition at an impoundment, refuse pile, or culm bank which requires emergency action in order to prevent failure, or which causes individuals to evacuate an area; or failure of an impoundment, refuse or culm bank; (xi) damage to hoisting equipment in a shaft or slope which endangers an individual or which interferes with use of the equipment for more than thirty minutes; and (xii) an event at a mine causes death or bodily injury to an individual not at a mine at the time the event occurs.

§45.2-501. / 30CFR 50.2 (h) (3)

Active Areas – All places in a mine that are ventilated, if underground, and examined regularly.

§45.2-501.

Active Workings – Any place in a mine where miners are normally required to work or travel.

§45.2-501.

Agent – Any person charged by the operator with responsibility for the operation of all or a part of a mine or the supervision of the miners in a mine.

§45.2-501.

Afterdamp- The mixture of gases that remains in a mine after a mine fire or an explosion. It usually contains methane, carbon monoxide, carbon dioxide, and nitrogen.

MSHA Safety Manual No. 2

Air Lock – A system of doors arranged to allow the passage of miners or vehicles through it without permitting appreciable airflow.

MSHA Safety Manual No. 2

Air Split – The division of the main air current in a mine into two or more parts.

MSHA Safety Manual No. 2

Alternating Current (AC) – Current, the direction of which is reversed at regular intervals – usually 120 reversals per second on 60 – cycle current.

MSHA Safety Manual No. 2

Approved – A device, apparatus, equipment, condition, method, course or practice approved in writing by the Chief,

§45.2-501.

Approved Roof Control Plan – The roof control plan and revisions thereof suitable to the roof conditions and mining systems of each coal mine, which has been approved by the Chief.

§45.2-710.A.

Armored Cable – A cable provided with a wrapping of metal, plastic or other approved material.

§45.2-501.

Ash – The inorganic residue after the incineration of coal to constant weight under standard conditions.

MSHA Safety Manual No. 12

Authorized Person – A person assigned by the operator or agent to perform a specific type of duty or duties or to be at a specific location or locations in the mine who is trained and has demonstrated the ability to perform such duty or duties safely and effectively.

§45.2-501.

Automated Temporary Roof Support (ATRS) – A device that provides temporary roof support from a location where the equipment operator is protected from roof falls.

30CFR §75.201

Automated Temporary Roof Support System – The devices and mechanisms, including the ATRS used and methods followed by which the ATRS is activated and set to support the roof.

§45.2-713.

Barricading – Enclosing part of a mine to prevent inflow of noxious gases from a mine fire, explosion, inundation of poisonous gases, etc.

Dictionary of Mining Terms

Blackdamp – An atmosphere depleted of oxygen and usually contains dangerous amounts of carbon dioxide or nitrogen. This atmosphere will usually not support life.

Dictionary of Mining Terms

Blower Fan – A fan with tubing used to direct part of a particular circuit of air to a working face.

Dictionary of Mining Terms

Booster Fan – An underground fan installed in conjunction with a main fan to increase the volume of air in one or more circuits.

§45.2-501.

Brattice – Stopping or curtain.

Dictionary of Mining Terms

B.T.U. (British Thermal Unit) – The amount of heat needed to raise one pound of water one degree Fahrenheit.

Dictionary of Mining Terms

Bump – In coal mining, shock due to the movement of coal, floor, or floor strata with sufficient violence to be heard and to vibrate mine workings.

Dictionary of Mining Terms

Cable – A stranded conductor (single-conductor cable) or a combination of conductors insulated from one another (multiple-conductor cable).

§45.2-501.

Calibration – To standardize as a measuring instrument by determining the deviation from the standard.

Dictionary of Mining Terms

Cap Wedge – A piece of wood installed between a post (timber) and the roof of a mine.

MSHA Safety Manual No. 18

Carbon Dioxide (**CO_2**) – An incombustible, suffocating gas found near the mine floor, in low-lying areas, behind seals, or in poorly ventilated places in coal mines. It can also be formed by complete combustion from mine fires and explosions.

MSHA Safety Manual No.14

Carbon Monoxide (**CO**) – A colorless, odorless, extremely poisonous and combustible gas formed as a product of incomplete combustion and in the gases from the detonation of explosives. It usually is the cause of death of miners following a mine fire or explosion.

MSHA Safety Manual No. 14

Certified Person – A person holding a valid certificate from the Board of Coal Mining Examiners authorizing him to perform the task to which he is assigned.

§45.2-501.

Check Curtain – A curtain used to deflect the air in coal mines from the entries into the working rooms and to hold the air along the faces.

Dictionary of Mining Terms

Chief – The Chief of the Coal Mine Safety of the Virginia Department of Energy.

§45.2-501.

Circuit – A conducting part or a system of conducting parts through which an electric current is intended to flow.

§45.2-501.

Circuit Breaker – An electrical device for interrupting a circuit between separable contacts under normal or abnormal conditions. Also an overload protection device installed in the positive circuit to interrupt the flow of electric current when it becomes excessive or merely exceeds a predetermined value. Also can be used as a disconnecting device.

§45.2-501.

Coal – A solid, brittle, or less distinctly stratified, combustible carbonaceous rock formed by partial to complete decomposition of vegetation; varies in color from dark brown to black; not fusible without decomposition and very insoluble.

§45.2-501.

Coal Mine – All parts of a mining operation on the surface and underground, that contributes (directly or indirectly) under one management to the mining and handling of coal at such site.

§45.2-501.

Creep – A crush that forces the pillars into the mine floor. This often gives the miner the impression that the floor is rising because the floor is softer than the roof.

Dictionary of Mining Terms

Crosscut (**Breakthrough**) – A connection made between two parallel entries or two parallel rooms.

Dictionary of Mining Terms

Cross Entry – Any entry or set of entries, turned from main entries, from which room entries are turned.

§45.2-501.

Direct Current – An electric current flowing in one direction only and sensibly free from pulsation.

Dictionary of Mining Terms

Direct Firefighting – A method of firefighting where an extinguishing agent is put directly onto the fire to put it out. Direct firefighting usually involves using dry-chemical extinguishers, water, rock dust, or foam to fight the fire.

Dictionary of Mining Terms

Drift Mine – A mine that opens into a level or nearly level seam of coal.

Dictionary of Mining Terms

Entry – A coal mine heading.

Dictionary of Mining Terms

Escapeway – An entry designated as a primary or secondary (alternate) escape way for travel by mining personnel to evacuate from the mine during a mine emergency. The primary escape way is designated as the smoke free intake.

Dictionary of Mining Terms

Experienced Surface Miner – A person with more than six months of experience.

§45.2-501.

Experienced Underground Miner – A person with more than six months underground experience.

§45.2-501.

Face – The area of a mine where coal is being extracted.

Dictionary of Mining Terms

Fault – A fracture in the coal seam accompanied by displacement.

Dictionary of Mining Terms

Firedamp – A combustible gas that is formed in mines by decomposition of coal or other carbonaceous matter and that consists mainly of methane and air. An explosive mixture of methane concentrations in the range of 5 to 15 percent.

Dictionary of Mining Terms

Fire Triangle – A triangle used to illustrate the three elements necessary for a fire to occur (fuel, oxygen and heat).

Dictionary of Mining Terms

Fixed Carbon – That part of the carbon that remains when coal is heated in a closed vessel until the volatile matter is driven off. It is the nonvolatile matter minus the ash.

Dictionary of Mining Terms

Footer – A piece of wood placed between a post (timber) and the mine floor.

Dictionary of Mining Terms

Fuse – An overcurrent protective device with a circuit-opening fusible member directly heated and destroyed by the passage of overcurrent through it.

§45.2-501.

Ground – A conducting connection, whether intentional or accidental, between an electrical circuit on equipment and either earth or some conducting body serving in place of the earth.

§45.2-501.

Grounded – Connected to earth or to some connecting body which serves in place of the earth.

§45.2-501.

Hazard – Any condition that may result in or contribute to an accident.

Dictionary of Mining Terms

High-Potential – High-voltage.

§45.2-501.

Immediate Roof – The lowest layer or layers of rock immediately above an underground opening.

§45.2-501.

Imminent Danger- The existence of any condition or practice in a mine which could reasonably be expected to cause death or serious personal injury before such condition or practice can be abated.

§45.2-501.

Inactive Mine – A mine (i.) at which coal or minerals have not been excavated or processed, or work, other than examinations by a certified person or emergency work to preserve the mine, has not been performed at an underground mine for a period of thirty days, or at a surface mine for a period of sixty days, (ii.) for which a valid license is in effect, and (iii.) at which reclamation activities have not been completed.

§45.2-501.

Inby – Toward the working face.

Dictionary of Mining Terms

Indirect Firefighting – A method of firefighting where a extinguishing agent is not applied directly on the fire. Instead, the fire area or the entire mine is sealed to exclude oxygen from the fire or flooded with water, foam, or nitrogen to exclude oxygen and extinguish the fire.

Dictionary of Mining Terms

Intake Air – Air that has not passed through the last active working place of the split of any working section or any worked out area where pillared or non-pillared and by analysis contains not less than 19.5 percent oxygen, not more than .5 percent carbon dioxide nor any hazardous quantities of flammable gas nor any harmful amounts of poisonous gas.

§45.2-501.

Interested Persons – Members of the Mine Safety Committee and other duly authorized representatives of the employees at the mine; federal and state coal mine inspectors; and, to extent required by the state mining law, any other person.

§45.2-501.

Lilly Control – A controller, used on both steam and electric winding engines, that protects against over-speed, over-wind, excessive acceleration, delay retardation, and starting in the wrong direction.

Dictionary of Mining Terms

Line Brattice – A partition placed in an opening to divide it into intake and return airways.

Dictionary of Mining Terms

Main Entry – The principal entry (or set of entries) driven through the coalbed from which cross entries, room entries, or rooms are turned.

§45.2-501.

Main Roof – The rock above the immediate roof.

Dictionary of Mining Terms

Mandoors – Small doors installed in stoppings. These doors allow passage of personnel from one entry to another.

Dictionary of Mining Terms

Mean Entry-Air Velocity – The quantity of air flowing over the machine and the machine operator. The minimum mean entry-air velocity must be at least 60 feet per minute in all working places where coal is being cut, mined, drilled for blasting or loaded from the face with mechanical mining equipment.

30 CFR §75.326

Methane – The most common explosive gas found in coal mines. It is tasteless,

colorless, nonpoisonous, odorless, and flammable. The explosive range is 5% to 15%.

Dictionary of Mining Terms

Methane Monitor – A system whereby the methane content of the mine air is indicated automatically at all times. When the methane level reaches a predetermined concentration, the electric power is de-energized automatically from the machine. The mechanism is so devised that its setting cannot be altered. The system is used mainly in conjunction with the operation of continuous miners, longwall shearers and loading machines.

Dictionary of Mining Terms

Mine – means any underground coal mine or surface coal mine. Mines that are adjacent to each other and under the same management and which are administered as distinct units shall be considered as separate mines. A site shall net be a mine unless the coal extracted or excavated therefrom is offered for sale or exchange, or used for any other commercial purposes. The area in which coal is excavated under an exemption to the permitting requirements of §45.2-851 shall not be a mine.

§45.2-501.

Mine Foreman – A person holding a valid certificate or qualification duly issued by action of the Board of Coal Mining Examiners.

§45.2-501.

Mine Fire – Virginia State Law--An unplanned fire not extinguished within thirty (30) minutes of discovery. MSHA---An unplanned underground fire not extinguished within ten (10) minutes of discovery.

§45.2-501.

Mine Inspector – A public employee assigned by the Chief to make mine inspections as required by the Coal Mine Safety Laws of Virginia and other laws.

§45.2-501.

Mine Resistance – The opposition (from the roof, ribs, and floor) to the flow of an air current through a mine. The amount of this resistance depends upon the extent and nature of rubbing surfaces, the area of the airways, and the velocity of the air.

Dictionary of Mining Terms

Miner – Any individual working in a mine.

§45.2-501.

Moisture (bed) – The total moisture in a seam of coal before working.

Dictionary of Mining Terms

Multiple-Entry System – A system of access or development openings, generally in bituminous coal mines, involving more than one pair of parallel entries, one for haulage and fresh-air intake and the other for return air. This system permits circulation of large volumes of air.

Dictionary of Mining Terms

Noxious – Causing or tending to cause injury, especially to health.

Dictionary of Mining Terms

Operator – Any person who operates, controls or supervises a mine or any independent contractor performing services or construction at such mines.

§45.2-501.

Outcrop – The part of a coal seam that appears at or near the surface.

Dictionary of Mining Terms

Overburden – The material that overlies a coal seam or deposit.

Dictionary of Mining Terms

Overcast – An enclosed airway that allows one air current to pass over another air current without interruption.

Dictionary of Mining Terms

Oxygen Deficiency – An atmosphere with an oxygen concentration below that found in normal air. Normal atmosphere contains 20.9% oxygen and atmosphere in a mine requires at least 19.5% oxygen.

Dictionary of Mining Terms

Panel System – A system of coal extraction in which the mine is laid off in separate panels with pillars or barriers left between.

Dictionary of Mining Terms

Permanent Seal – One in which a concrete or block wall is used to seal off a portion of the mine because a fire has occurred or an area has been worked out.

Dictionary of Mining Terms

Permanent Support – Roof support, such as timbers, roof bolts or steel jacks, used to support an area.

Dictionary of Mining Terms

Permissible – A device, process, equipment or method classified by such term by the Mine Safety and Health Administration, when such classification is adopted by the Chief or the Director and includes, unless otherwise expressly stated, all requirements, restrictions, exceptions, limitations, and conditions attached to such classification by the Administration.

§45.2-501.

Personal Protective Equipment – Any device or apparel worn to protect the worker from exposure to or contact with harmful energy or hazardous material.

§45.2-501.

Pillar – The coal left to support the overlying strata in a mine.

Dictionary of Mining Terms

Pillar Extraction – Removal of the supporting coal pillars during retreat or "second" mining.

Dictionary of Mining Terms

Pitot Tube – A device consisting of two concentric tubes bent in an "L" shape which is placed in an airstream and used with a magnehelic gauge to determine air velocity by measuring velocity pressure, static pressure and total pressure.

Dictionary of Mining Terms

Post – A mine timber used to support the roof.

Dictionary of Mining Terms

Propagate – To transmit or spread from place to place; as coal dust propagates a mine explosion.

Dictionary of Mining Terms

Quantity – Volumetric flow rate of air per unit time. Measured in cubic feet per minute (CFM).

Dictionary of Mining Terms

Regulator – A ventilation device, such as an opening in a wall or door, usually placed at the return of a split of air to govern the amount of air entering that portion of the mine.

Dictionary of Mining Terms

Resistor – A device used to provide resistance in an electric circuit, usually designed to limit the current, dissipate energy, or provide heat.

Dictionary of Mining Terms

Respirator – Any protective device designed to protect the user's respiratory system from inhalation of a harmful atmosphere.

Dictionary of Mining Terms

Return Air – Air that has passed through the last active working place on each split, or air that has passed through a worked out area where pillared or non-pillared.

§45.2-501.

Rheostat – An instrument by which a variable or an adjustable resistance may be introduced into a circuit to regulate the strength of a current, as in the field coils of a motor or a generator.

Dictionary of Mining Terms

Rib – The side of a pillar or the wall of an entry.

Dictionary of Mining Terms

Rock Dust – General name for any kind of inert dust used in rendering coal dust incombustible.

Dictionary of Mining Terms

Roof – The rock immediately above the coal seam.

Dictionary of Mining Terms

Room – An underground area in which coal is mined.

Dictionary of Mining Terms

Room-and-Pillar System – A system of mining in which the distinguishing feature is the mining of 50 percent or more of the coal in the first working.

Dictionary of Mining Terms

Room Entry – Any entry or set of entries from which rooms are turned – a panel entry.

Dictionary of Mining Terms

Section – A part of the working area of the mine.

Dictionary of Mining Terms

Self-Rescuer – A device used to protect a miner against smoke, carbon monoxide, carbon dioxide, oxygen deficiency, and other poisonous gases during a mine emergency such as fire, explosion, gas inundation, cutting into old works, etc.

Dictionary of Mining Terms

Serious Personal Injury –Means any injury which has a reasonable potential to cause death or an injury other than a sprain or strain which requires admission to a hospital for 24 hours or more for medical treatment.

§45.2-501.

Shaft – A vertical or steeply inclined excavation or opening from the surface down through the strata to the coal or mineral to be developed.

Dictionary of Mining Terms

Shelter Hole – In mining, a niche in the rib along a haulage road into which one may step to avoid passing equipment.

Dictionary of Mining Terms

Short Circuiting – An abnormal connection of relatively low resistance, whether made accidentally or intentionally, between two points of different potential in a circuit. When referring to ventilation, it means that the air current is not completely reaching the desired location.

Dictionary of Mining Terms

Shot Firer – A certified miner whose special duty is to fire shots or blasts in coal mines.

Dictionary of Mining Terms

Slope – An entrance to a mine driven on an incline to a coal seam.

Dictionary of Mining Terms

Specific Gravity – The ratio of the weight of a specific volume of gas to the weight of an equal volume of air at the same temperature and pressure. Thus, the specific gravity of air is one (1) (by definition). A gas lighter than air has a specific gravity less than one and the specific gravity of a gas heavier than air is greater than one.

Dictionary of Mining Terms

Split Ventilation – The dividing of the main air current into separate individual currents.

Dictionary of Mining Terms

Squeeze – A crushing of coal, with the roof moving nearer to the floor.

Dictionary of Mining Terms

Stinkdamp – Hydrogen sulfide gas (highly toxic) in the mine air.

Substation – An electrical installation containing generating or power conversion equipment and associated electric equipment.

§45.2-501.

Temporary Seal – A means (usually constructed of brattice cloth) of closing of a portion of a mine until permanent seals can be erected.

Dictionary of Mining Terms

Temporary Stopping – A means (usually constructed of brattice cloth) of deflecting the air current into the working faces until permanent stoppings can be erected.

MSHA Safety Manual No. 20

Temporary Support – Usually timbers or steel jacks used to hold unsupported roof until permanent supports (such as roof bolts) can be installed.

Dictionary of Mining Terms

Top Person – A person holding a valid certificate of qualification issued by the Board of Coal Mining Examiners.

§45.2-501.

Transformer – A device that (through electromagnetic induction but without use of moving parts) transforms alternating or intermittent electric energy in one circuit into energy of similar type in another circuit, commonly with altered values of voltage and current.

Dictionary of Mining Terms

Velocity – The speed of a ventilating current; linear flow rate of air per unit time measured in feet per minute.

Dictionary of Mining Terms

Volatile Matter – Those products (exclusive of moisture) that are driven off as a gas during standard analytical procedures that involve heat without combustion.

Dictionary of Mining Terms

Volumeter – An instrument used to analyze the total incombustibility of samples of mine dust from the side, roof and floor.

Dictionary of Mining Terms

Water Gauge – An instrument used for measuring the difference in pressure of an air current produced by a ventilating fan.

Dictionary of Mining Terms

Whitedamp – Carbon monoxide gas (highly toxic) in the mine air; usually formed by a fire or explosion.

Dictionary of Mining Terms

Working Coal Miner – A person who is employed to work in coal mining operations; may include supervisory personnel.

§45.2-501.

Working Face – Those areas within a mine from which coal is being extracted or is to be extracted.

§45.2-501.

Working Place – The area of an underground mine inby the last open crosscut.

§45.2-501.

Working Section – All areas from the loading point of a section to and including the working faces.

§45.2-501.

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CODE OF FEDERAL RGULATIONS
30 CFR-PART 75

TABLE OF CONTENTS

Subpart A-General

Subpart B - Qualified and Certified Persons

Subpart C - Roof Support

Subpart D - Ventilation

Subpart E - Combustible Materials and Rock Dusting

Subpart F - Electrical Equipment - General

Subpart G - Trailing Cables

Subpart H - Grounding

Subpart I - Underground High-Voltage Distribution

High-Voltage Long walls

Subpart J - Underground Low-and Medium-Voltage Alternating Current Circuits

Subpart K - Trolley Wires and Trolley Feeder Wires

Subpart L - Fire Protection

TRANSPORTATION, HANDLING AND STORAGE OF LIQUEFIED AND NONLIQUEFIED COMPRESSED GAS CYLINDERS

FIRE SUPPRESSION DEVICES AND FIRE-RESISTANT HYDRAULIC FLUIDS ON UNDERGROUND EQUIPMENT

Subpart M - Maps

Subpart N - Explosives and Blasting

Subpart O - Hoisting and Mantrips

WIRE ROPES

Subpart P - Mine Emergencies

Subpart Q - Communications

Subpart R - Miscellaneous

Subpart S - Reserved

SOURCE: 35 FR 17890, Nov. 20, 1970, unless otherwise noted.

Subpart T - Diesel-Powered Equipment

Sec.

CODE OF FEDERAL REGULATIONS

30 CFR – PART 75

MANDATORY SAFETY STANDARDS – UNDERGROUND COAL MINE

Subpart A - General

30 CFR §75.1

Scope.

This part 75 sets forth safety standards compliance with which is mandatory in each underground coal mine subject to the Federal Mine Safety and Health Act of 1977. Some standards also are applicable to surface operations. Regulations and criteria supplementary to these standards also are set forth in this part.

[35 FR 17890, Nov. 20, 1970, as amended at 43 FR 12319, Mar. 24, 1978]

30 CFR §75.2

Definitions.

The following definitions apply in this part.

Act. The Federal Mine Safety and Health Act of 1977.

Active workings. Any place in a coal mine where miners are normally required to work or travel.

Adequate interrupting capacity. The ability of an electrical protective device, based upon its required and intended application, to safely interrupt values of current in excess of its trip setting or melting point.

Anthracite. Coals with a volatile ratio equal to 0.12 or less. The volatile ratio is the volatile matter content divided by the volatile matter plus the fixed carbon.

Approval documentation. Formal papers issued by the Mine Safety and Health Administration which describe and illustrate the complete assembly of electrical machinery or accessories which have met the applicable requirements of 30 CFR part 18.

Certified or registered. As applied to any person, a person certified or registered by the State in which the coal mine is located to perform duties prescribed by this part 75, except that in a State where no program of certification or registration is provided or where the program does not meet at least minimum Federal standards established by the Secretary, such certification or registration shall be by the Secretary.

Circuit-interrupting device. A device designed to open and close a circuit by nonautomatic means and to open the circuit automatically at a predetermined overcurrent value without damage to the device when operated within its rating.

Coal mine. Includes areas of adjoining mines connected underground.

Filter Self-Rescuer (FSR). A type of gas mask approved by MSHA and NIOSH under 42

CFR part 84 for escape only from underground mines and which provides at least 1 hour of protection against carbon monoxide.

Ground fault or grounded phase. An unintentional connection between an electric circuit and the grounding system.

Low voltage. Up to and including 660 volts, medium voltage means voltages from 661 to 1,000 volts; and high-voltage means more than 1,000 volts.

Motor-starter enclosure. An enclosure containing motor starting circuits and equipment.

Nominal voltage. The phase-to-phase or line-to-line root-mean- square value assigned to a circuit or system for designation of its voltage class, such as 480 or 4,160 volts. Actual voltage at which the circuit or system operates may vary from the nominal voltage within a range that permits satisfactory operation of equipment.

Permissible. (1) As applied to electric face equipment, all electrically operated equipment taken into or used inby the last open crosscut of an entry or a room of any coal mine the electrical parts of which, including, but not limited to, associated electrical equipment, components, and accessories, are designed, constructed, and installed, in accordance with the specifications of the Secretary, to assure that such equipment will not cause a mine explosion or mine fire, and the other features of which are designed and constructed, in accordance with the specifications of the Secretary, to prevent, to the greatest extent possible, other accidents in the use of such equipment. The regulations of the Secretary or the Director of the Bureau of Mines in effect on March 30, 1970, relating to the requirements for investigation, testing, approval, certification, and acceptance of such equipment as permissible shall continue in effect until modified or superseded by the Secretary, except that the Secretary shall provide procedures, including, where feasible, testing, approval, certification, and acceptance in the field by an authorized representative of the Secretary, to facilitate compliance by an operator with the requirements of §75.500 within the periods prescribed in §75.500.

(2) As applied to equipment other than permissible electric face equipment: (i) Equipment used in the operation of a coal mine to which an approval plate, label, or other device is attached as authorized by the Secretary and which meets specifications which are prescribed by the Secretary for the construction and maintenance of such equipment and are designed to assure that such equipment will not cause a mine explosion or a mine fire. (ii) The manner of use of equipment means the manner of use prescribed by the Secretary.

Qualified person. As the context requires:

(1) An individual deemed qualified by the Secretary and designated by the operator to make tests and examinations required by this part 75; and

(2) An individual deemed, in accordance with minimum requirements to be established by the Secretary, qualified by training, education, and experience, to perform electrical work, to maintain electrical equipment, and to conduct

examinations and tests of all electrical equipment.

Respirable dust. Dust collected with a sampling device approved by the Secretary and the Secretary of Health and Human Services in accordance with part 74--Coal Mine Dust Personal Sampler Units of this title. Sampling device approvals issued by the Secretary of the Interior and Secretary of Health, Education, and Welfare are continued in effect.

Rock dust. Pulverized limestone, dolomite, gypsum, anhydrite, shale, adobe, or other inert material, preferably light colored, 100 percent of which will pass through a sieve having 20 meshes per linear inch and 70 percent or more of which will pass through a sieve having 200 meshes per linear inch; the particles of which when wetted and dried will not cohere to form a cake which will not be dispersed into separate particles by a light blast of air; and which does not contain more than 5 percent combustible matter or more than a total of 4 percent free and combined silica (SiO_2), or, where the Secretary finds that such silica concentrations are not available, which does not contain more than 5 percent of free and combined silica.

Secretary. The Secretary of Labor or the Secretary's delegate.

Self-Contained Self-Rescuer (SCSR). A type of closed-circuit, self-contained breathing apparatus approved by MSHA and NIOSH under 42 CFR part 84 for escape only from underground mines.

Short circuit. An abnormal connection of relatively low impedance, whether made accidentally or intentionally, between two points of different potential.

Working face. Any place in a coal mine in which work of extracting coal from its natural deposit in the earth is performed during the mining cycle.

Working place. The area of a coal mine inby the last open crosscut.

Working section. All areas of the coal mine from the loading point of the section to and including the working faces.

[57 FR 20913, May 15, 1992; 60 FR 30398, June 8, 1995]

Subpart B – Qualified and Certified Persons

30 CFR §75.100

Certified person.

(a) The provisions of Subpart D--Ventilation of this Part 75 require that certain examinations and tests be made by a certified person. A certified person within the meaning of those provisions is a person who has been certified as a mine foreman (mine manager), an assistant mine foreman (section foreman), or a Pre-shift examiner (mine

examiner). A person who has been so certified is also a qualified person within the meaning of those provisions of Subpart D of this part which require that certain tests be made by a qualified person and within the meaning of §75.1106.

(b) A person who is certified as a mine foreman, an assistant mine foreman, or a Pre-shift examiner by the State in which the coal mine is located is, to the extent of the State's certification, a certified person within the meaning of the provisions of Subpart D of this part and §75.1106 referred to in paragraph (a) of this section.

(c)(1) The Secretary may certify persons in the categories of mine foreman, assistant mine foreman, and Pre-shift examiner whenever the State in which persons are presently employed in these categories does not provide for such certification. A person's initial certification by MSHA is valid for as long as the person continues to satisfy the requirements necessary to obtain the certification and is employed at the same coal mine or by the same independent contractor. The mine operator or independent contractor shall make an application which satisfactorily shows that each such person has had at least 2 years underground experience in a coal mine, and has held the position of mine foreman, assistant mine foreman, or Pre-shift examiner for a period of 6 months immediately preceding the filing of the application, and is qualified to test for methane and for oxygen deficiency. Applications for Secretarial certification should be submitted in writing to the Health and Safety Activity, Mine Safety and Health Administration, Certification and Qualification Center, P.O. Box 25367, Denver Federal Center, Denver, Colorado 80225.

(2) A person certified by the Secretary under this paragraph will be a certified person, within the meaning of the provisions for Subpart D of this part and [35 FR 17890, Nov. 20, 1970, as amended at 43 FR 12320, Mar. 24, 1978; 54 FR 30514, July 20, 1989]

30 CFR §75.150

Tests for methane and for oxygen deficiency; qualified person.

(a) The provisions of Subpart D--Ventilation of this part and §75.1106 require that tests for methane and for oxygen deficiency be made by a qualified person. A person is a qualified person for this purpose if he is a certified person under §75.100. Pending issuance of Federal standards, a person will be considered a qualified person for testing for methane and for oxygen deficiency:

(1) If he has been qualified for this purpose by the State in which the coal mine is located; or

(2) The Secretary may qualify persons for this purpose in a coal mine in which persons are not qualified for this purpose by the State upon an application and a satisfactory showing by the operator of the coal mine that each such person has been trained and designated by the operator to test for methane and oxygen deficiency and has made such tests for a period of 6 months immediately preceding the application. Applications for Secretarial qualification should be submitted to the Health and Safety Activity, Mine Safety and Health Administration, Certification and

Qualification Center, P.O. Box 25367, Denver Federal Center, Denver, Colo. 80225.

[35 FR 17890, Nov. 20, 1970, as amended at 43 FR 12320, Mar. 24, 1978]

30 CFR §75.151

Tests for methane; qualified person; additional requirement.

Notwithstanding the provisions of §75.150, on and after January 1, 1971, no person shall be a qualified person for testing for methane unless he demonstrates to the satisfaction of an authorized representative of the Secretary that he is qualified to test for methane with a portable methane detector approved by the Bureau of Mines or the Mine Safety and Health Administration under Part 22 of this chapter (Bureau of Mines Schedule 8C).

30 CFR §75.152

Tests of air flow; qualified person.

A person is a qualified person within the meaning of the provisions of Subpart D--Ventilation of this part requiring that tests of air flow be made by a qualified person only if he is a certified person under §75.100 or a person trained and designated by a certified person to perform such tests.

30 CFR §75.153

Electrical work; qualified person.

(a) Except as provided in paragraph (f) of this section, an individual is a qualified person within the meaning of §§75.511 and 75.512 to perform electrical work (other than work on energized surface high-voltage lines) if:

(1) He has been qualified as a coal mine electrician by a State that has a coal mine electrical qualification program approved by the Secretary; or,

(2) He has at least 1 year of experience in performing electrical work underground in a coal mine, in the surface work areas of an underground coal mine, in a surface coal mine, in a noncoal mine, in the mine equipment manufacturing industry, or in any other industry using or manufacturing similar equipment, and has satisfactorily completed a coal mine electrical training program approved by the Secretary; or,

(3) He has at least 1 year of experience, prior to the date of the application required by paragraph (c) of this section, in performing electrical work underground in a coal mine, in the surface work areas of an underground coal mine, in a surface coal mine, in a noncoal mine, in the mine equipment manufacturing industry, or in any other industry using or manufacturing similar equipment, and he attains a satisfactory grade on each of the series of five written tests approved by the Secretary and prescribed in paragraph (b) of this section.

(b) The series of five written tests approved by the Secretary shall include the following categories:

(1) Direct current theory and application;

(2) Alternating current theory and application;

(3) Electric equipment and circuits;

(4) Permissibility of electric equipment; and,

(5) Requirements of Subparts F through K of this Part 75.

(c) In order to take the series of five written tests approved by the Secretary, an individual shall apply to the District Manager and shall certify that he meets the requirements of paragraph (a)(3) of this section. The tests will be administered in the Coal Mine Safety and Health Districts at regular intervals, or as demand requires.

(d) A score of at least 80 percent of each of the five written tests will be deemed to be a satisfactory grade. Recognition shall be given to practical experience in that 1 percentage point shall be added to an individual's score in each test for each additional year of experience beyond the 1 year minimum requirement specified in paragraph (a)(3) of this section; however, in no case shall an individual be given more than 5 percentage points for such practical experience.

(e) An individual may, within 30 days from the date on which he received notification from the Administration of his test scores, repeat those on which he received an unsatisfactory score. If further retesting is necessary after this initial repetition, a minimum of 30 days from the date of receipt of notification of the initial retest scores shall elapse prior to such further retesting.

(f) An individual who has, prior to November 1, 1972, been qualified to perform electrical work specified in §§75.511 and 75.512 (other than work on energized surface high-voltage lines) shall continue to be qualified until June 30, 1973. To remain qualified after June 30, 1973, such individual shall meet the requirements of either paragraph (a)(1), (2), or (3) of this section.

(g) An individual qualified in accordance with this section shall, in order to retain qualification, certify annually to the District Manager, that he has satisfactorily completed a coal mine electrical retraining program approved by the Secretary.

[37 FR 22376, Oct. 19, 1972, as amended at 44 FR 9380, Feb. 13, 1979; 47 FR 23641, May 28, 1982]

30 CFR §75.154

Repair of energized surface high-voltage lines; qualified person.

An individual is a qualified person within the meaning of §75.705 for the purpose of repairing energized surface high-voltage lines only if he has had at least 2 years experience in electrical maintenance, and at least 2 years experience in the repair of energized high-voltage surface lines located on poles or structures.

30 CFR §75.155

Qualified hoisting engineer; qualifications.

(a)(1) A person is a qualified hoisting engineer within the provisions of Subpart O of this part, for the purpose of operating a steam-driven hoist in a coal mine, if he has at least 1 year experience as an engineer in a steam-driven hoisting plant and is qualified by the State in which the mine is located as a steam-hoisting engineer; or

(2) If a State has no program for qualifying persons as steam-hoisting engineers, the Secretary may qualify persons for this purpose if the operator of the coal mine in which such persons are employed, or the independent contractor, makes an application and a satisfactory showing that each such person has had 1 year experience in operating steam- driven hoists and has held the position of hoisting engineer for a period of 6 months immediately preceding the application. A person's qualification is valid for as long as this person continues to satisfy the requirements necessary for qualification and is employed at the same coal mine or by the same independent contractor.

(b)(1) A person is a qualified hoisting engineer within the provisions of Subpart O of this part, for the purpose of operating an electrically driven hoist in a coal mine, if he has at least 1 year experience operating a hoist plant in a mine or maintaining electric-hoist equipment in a mine and is qualified by the State in which the mine is located as an electric-hoisting engineer; or

(2) If a State has no program for qualifying persons as electric-hoisting engineers, the Secretary may qualify persons for this purpose if the operator of the coal mine in which such persons are employed, or the independent contractor, makes an application and a satisfactory showing that each such person has had 1 year experience in operating electric-driven hoists and has held the position of hoisting engineer for a period of 6 months immediately preceding the application. A person's qualification is valid for as long as this person continues to satisfy the requirements for qualification and is employed at the same coal mine or by the same independent contractor.

(c) Applications for Secretarial qualification should be submitted to the Health and Safety Activity, Mine Safety and Health Administration, Certification and Qualification Center, P.O. Box 25367, Denver Federal Center, Denver, Colo. 80225.

[35 FR 17894, Nov. 20, 1970, as amended at 43 FR 12320, Mar. 24, 1978; July 20, 1989]

30 CFR §75.156

AMS operator, qualifications.

(a) To be qualified as an AMS operator, a person shall be provided with task training on duties and responsibilities at each mine where an AMS operator is employed in accordance with the mine operator's approved Part 48 training plan.

(b) An AMS operator must be able to demonstrate to an authorized representative of the Secretary that he/she is qualified to perform in the assigned position.

[73 FR 80612, Dec. 31, 2008]

30 CFR §75.159

Records of certified and qualified persons.

The operator of each coal mine shall maintain a list of all certified and qualified persons designated to perform duties under this Part 75.

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14706, Apr. 6, 1982; 60 FR 33719, June 29, 1995]

30 CFR §75.160

Training programs.

Every operator of a coal mine shall provide a program, approved by the Secretary, of training and retraining of both qualified and certified persons needed to carry out functions prescribed in the Act.

30 CFR §75.161

Plans for training programs

Each operator must submit to the district manager, of the Coal Mine Safety and Health District in which the mine is located, a program or plan setting forth what, when, how, and where the operator will train and retrain persons whose work assignments require that they be certified or qualified. The program must provide--
(a) For certified persons, annual training courses in first aid, principles of mine rescue, and the provisions of this part 75; and

(b) For qualified persons, annual courses in performance of the task which they perform as qualified persons.

[53 FR 10336, Mar. 30, 1988] SOURCE: 53 FR 2375, Jan. 27, 1988, unless otherwise noted.

Subpart C - Roof Support

30 CFR §75.200

Scope.

This Subpart C 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 subpart are not affected so long as the support system continues to effectively control the roof, face and ribs.

30 CFR §75.201

Definitions.

Automated temporary roof support (ATRS) system. A device to provide temporary roof support from a location where the equipment operator is protected from roof falls.

Pillar recovery. Any reduction in pillar size during retreat mining.

30 CFR §75.202

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 subpart.

30 CFR §75.203

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 12 inches; and

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

30 CFR §75.204

Roof bolting.

(a) For roof bolts and accessories addressed in ASTM F432-95, "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 F432-95; and

(2) Make this certification available to an authorized representative of the Secretary and to the representative of miners.

(b) Roof bolts and accessories not addressed in ASTM F432-95 may be used, provided that the use of such materials is approved by the District Manager based on—

(1) Demonstrations which show that the materials have successfully supported the roof in an area of a coal mine with similar strata, opening dimensions and roof stresses; or

(2) Tests which show the materials 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 6 inches square or the equivalent, except that where the mine roof is firm and not susceptible to sloughing, bearing plates 5 inches square or the equivalent may be used.

(3) Bearing plates used with wood or metal materials shall be at least 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 years or more shall be treated to minimize deterioration.

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

(e)(1) 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.

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

(f) Tensioned roof bolts. (1) Roof bolts that provide support by creating a beam of laminated strata shall be at least 30 inches long. Roof bolts that provide support by suspending the roof from overlying stronger strata shall be long enough to anchor at least 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 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 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—

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

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

(6) The mine operator or a person designated by the operator shall certify by signature and date that measurements required by paragraph (f)(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 Secretary 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.

(8) Angle compensating devices shall be used to compensate for the angle when tensioned roof bolts are installed at angles greater than 5 degrees from the perpendicular

to the bearing plate.

(g) 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 150 foot-pounds of torque without rotating in the hole, corrective action shall be taken.

[53 FR 2375, Jan. 27, 1988, as amended at 55 FR 4595, Feb. 8, 1990; 63 FR 20030, Apr. 22, 1998]

30 CFR §75.205

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 10 feet crosswise.

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

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

30 CFR §75.206

Conventional roof support.

(a) Except in anthracite mines using non-mechanized mining systems, when conventional roof support materials are used as the only means of support—

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

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

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

(ii) 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 16 feet wide where full overhead support is used and 14 feet wide where only posts are used;

(5) Curved roadways shall not exceed 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 108 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:

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

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

(iii) Planks shall be at least 6 inches wide and 1 inch thick.

(3) Cribbing materials shall have at least two 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 4 inches or have a cross-sectional area less than 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 footing.

(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 36 square inches of roof bearing

surface.

30 CFR §75.207

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--

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

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

(2) Only one open roadway, which shall not exceed 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 14 feet.

(d) During open-end pillar extraction, at least 2 rows of breaker posts or equivalent support shall be installed on not more than 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 7 feet of the face and the width of the roadway shall not exceed 16 feet. Where posts are used as the sole means of roof support, the width of the roadway shall not exceed 14 feet.

30 CFR §75.208

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.

30 CFR §75.209

Automated Temporary Roof Support (ATRS) systems.
(a) Except in anthracite mines and as specified in paragraphs (b) and (c) of this section, an ATRS system shall be used with roof bolting machines and continuous-mining machines with integral roof bolters operated in a working section. The requirements of this paragraph shall be met according to the following schedule:

(1) All new machines ordered after March 28, 1988.

(2) All existing machines operated in mining heights of 36 inches or more after March 28, 1989; and

(3) All existing machines operated in mining heights of 30 inches or more but less than 36 inches after March 28, 1990.

(b) After March 28, 1990 the use of ATRS systems with existing roof bolting machines and continuous-mining machines with integral roof bolters operated in a working section where the mining height is less than 30 inches shall be addressed in the roof control plan.

(c) Alternative means of temporary support shall be used, as specified in the roof control plan, when--

(1) Mining conditions or circumstances prevent the use of an ATRS system; or

(2) Temporary supports are installed in conjunction with an ATRS system.

(d) Persons shall work or travel between the support device of the ATRS system and another support, and the distance between the support device of the ATRS system and support to the left, right or beyond the ATRS system, shall not exceed 5 feet.

(e) Each ATRS system shall meet each of the following:

(1) The ATRS system shall elastically support a deadweight load measured in pounds of at least 450 times each square foot of roof intended to be supported, but in no case less than 11,250 pounds.

(2) The controls that position and set the ATRS system shall be—

(i) Operable from under permanently supported roof; or

(ii) Located in a compartment, which includes a deck, that provides the equipment operator with overhead and lateral protection, and has the structural capacity to elastically support a deadweight load of at least 18,000 pounds.

(3) All jacks affecting the capacity of the ATRS system and compartment shall

have check valves or equivalent devices that will prevent rapid collapse in the event of a system failure.

(4) Except for the main tram controls, tram controls for positioning the equipment to set the ATRS system shall limit the speed of the equipment to a maximum of 80 feet-per-minute.

(f) The support capacity of each ATRS system and the structural capacity of each compartment shall be certified by a registered engineer as meeting the applicable requirements of paragraphs (e)(1) and (e)(2) of this section. The certifications shall be made available to an authorized representative of the Secretary and representative of the miners.

30 CFR §75.210

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 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 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 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.

30 CFR §75.211

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.

30 CFR §75.212

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 5-foot centers, or equally effective support.

30 CFR §75.213

Roof support removal.

(a)(1) All persons who perform the work of removing permanent roof supports shall be supervised by a management person experienced in removing roof supports.

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

(b) Prior to the removal of permanent roof supports, the person supervising roof support removal in accordance with paragraph (a)(1) of this section shall examine the roof conditions in the area where the supports are to be removed and designate each support to be removed.

(c)(1) Except as provided in paragraph (g) of this section, prior to the removal of permanent supports, a row of temporary supports on no more than 5-foot centers or equivalent support shall be installed across the opening within 4 feet of the supports being removed. Additional supports shall be installed where necessary to assure safe removal.

(2) Prior to the removal of roof bolts, temporary support shall be installed as close as practicable to each roof bolt being removed.

(d) Temporary supports installed in accordance with this section shall not be removed unless--

(1) Removal is done by persons who are in a remote location under supported roof; and

(2) At least two rows of temporary supports, set across the opening on no more than 5-foot centers, are maintained between the miners and the unsupported area.

(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 as provided in paragraph (g) of this section, permanent support shall not be removed where--

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

(2) Roof fractures are present;

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

(4) Pillar recovery has been conducted.

(g) Permanent supports may be removed provided that:

(1) Removal is done by persons who are in a remote location under supported roof; and

(2) At least two rows of temporary supports, set across the opening on no more than 5-foot centers, are maintained between the miners and the unsupported area.

(h) The provisions of this section do not apply to removal of conventional supports for starting crosscuts and pillar splits or lifts except that prior to the removal of these supports an examination of the roof conditions shall be made.

[55 FR 4595, Feb. 8, 1990]

30 CFR §75.214

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 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.

30 CFR §75.215

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.

30 CFR §75.220

Roof control plan.

(a)(1) Each mine operator shall develop and follow a roof control plan, approved by the District Manager, 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 District Manager. When revisions to a roof control plan are proposed, only the revised pages need to be submitted unless otherwise specified by the District Manager.

(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 District Manager.

(3) Before new support materials, devices or systems other than roof bolts and accessories, are used as the only means of roof support, the District Manager 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.

[53 FR 2375, Jan. 27, 1988; 53 FR 11395, Apr. 6, 1988, as amended at 60 FR 33723, June 29, 1995; 71 FR 16668, Apr. 3, 2006]

30 CFR §75.221

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—

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

(ii) 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 10 feet below the coalbed; and

(iii) 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—

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

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

(iii) 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—

(i) From falling material at drift openings; and

(ii) When mining approaches within 150 feet of an outcrop.

(12) A description of the roof and rib support necessary for the refuge alternatives.

(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 5 feet to the inch or more than 20 feet to the inch.

(c) All roof control plan information, including drawings, shall be submitted on 8½ by 11 inch paper, or paper folded to this size.

[53 FR 2375, Jan. 27, 1988, as amended at 60 FR 33723, June 29, 1995; 73 FR 80697, Dec. 31, 2008]

30 CFR §75.222

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 District Manager. Roof control plans that do not conform to the applicable criteria in this section may be approved by the District Manager, 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 5 feet lengthwise and crosswise, except as specified in §75.205.

(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 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 20 feet wide should be supported by a combination of roof bolts and conventional supports.

(4) In any opening more than 20 feet wide--

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

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

(5) Openings should not be more than 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 5-foot centers where the work is performed.

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

(d) *Pillar recovery.* (1) During development, any dimension of a pillar should be at least 20 feet.

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

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

(4) Roadside-radius (turn) posts, or equivalent support, should be installed on not more than 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 16 feet wide, at least one row of posts should be installed to limit the roadway width to 16 feet. These posts should be--

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

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

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

(f) *ATRS systems in working sections where the mining height is below 30 inches.* In working sections where the mining height is below 30 inches, an ATRS system should be

used to the extent practicable during the installation of roof bolts with roof bolting machines and continuous-mining machines with integral roof bolters.

(g) *Longwall mining systems.* (1) Systematic supplemental support should be installed throughout—

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

(ii) 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--

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

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

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

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

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

(vi) 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.

30 CFR §75.223

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 indicates the plan is inadequate. The accident and injury experience at each mine shall be reviewed at least every six 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 hour.

(c.) The mine map on which roof falls are plotted shall be available at the mine site for inspection by authorized representatives of the Secretary and representatives of miners at the mine.

(d.) roof control plan for each mine shall be reviewed every six months by an authorized representative of the Secretary. 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.

[53 FR 2375, Jan. 27, 1988; 53 FR 11395, Apr. 6, 1988; 60 FR 33719, June 29, 1995]

Subpart D--Ventilation

SOURCE: 57 FR 20914, Mar. 15, 1992, unless otherwise noted.

EFFECTIVE DATE NOTE: At 57 FR 20914, Mar. 15, 1992, subpart D was revised, effective August 16, 1992.

30 CFR §75.300

Scope.

This subpart sets requirements for underground coal mine ventilation.

30 CFR §75.301

Definitions.

In addition to the applicable definitions in §75.2, the following definitions apply in this subpart.

Air course. An entry or a set of entries separated from other entries by stoppings, overcasts, other ventilation control devices, or by solid blocks of coal or rock so that any mixing of air currents between each is limited to leakage.

AMS operator. The person(s), designated by the mine operator, who is located on the surface of the mine and monitors the malfunction, alert, and alarm signals of the AMS and notifies appropriate personnel of these signals.

Appropriate personnel. The person or persons designated by the operator to perform specific tasks in response to AMS signals. Appropriate personnel include the responsible person(s) required by §75.1501 when an emergency evacuation is necessary.

Atmospheric Monitoring System (AMS). A network consisting of hardware and software meeting the requirements of §§75.351 and 75.1103-2 and capable of: measuring atmospheric parameters; transmitting the measurements to a designated surface location; providing alert and alarm signals; processing and cataloging atmospheric data; and, providing reports. Early-warning fire detection systems using newer technology that provides equal or greater protection, as determined by the Secretary, will be considered atmospheric monitoring systems for the purposes of this subpart.

Belt air course. The entry in which a belt is located and any adjacent entry(ies) not separated from the belt entry by permanent ventilation controls, including any entries in series with the belt entry, terminating at a return regulator, a section loading point, or the surface.

Carbon monoxide ambient level. The average concentration in parts per million (ppm) of carbon monoxide detected in an air course containing carbon monoxide sensors. This average concentration is representative of the composition of the mine atmosphere over a period of mining activity during non-fire conditions. Separate ambient levels may be established for different areas of the mine.

Incombustible. Incapable of being burned.

Intake air. Air that has not yet ventilated the last working place on any split of any working section, or any worked-out area, whether pillared or nonpillared.

Intrinsically safe. Incapable of releasing enough electrical or thermal energy under normal or abnormal conditions to cause ignition of a flammable mixture of methane or natural gas and air of the most easily ignitable composition.

Noncombustible structure or area. Describes a structure or area that will continue to provide protection against flame spread for at least 1 hour when subjected to a fire test incorporating an ASTM E119-88 time/temperature heat input, or equivalent. The publication ASTM E119-88 “Standard Test Methods for Fire Tests of Building Construction and Materials” is incorporated by reference and may be inspected at any MSHA Coal Mine Safety and Health District Office, or at MSHA's Office of Standards, Regulations, and Variances, 201 12th Street South, Arlington, VA 22202-5452; 202-693-9440; or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal__register/code__of__federal__regulations/ibr__locations.html. In addition, copies of the document can be purchased from the American Society for Testing and Materials (ASTM), 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959; 610-832-9500; http://www.astm.org. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51.

Noncombustible material. Describes a material that, when used to construct a ventilation control, results in a control that will continue to serve its intended function for 1 hour when subjected to a fire test incorporating an ASTM E119-88 time/temperature heat input, or equivalent. The publication ASTM E119-88 "Standard Test Methods for Fire Tests of Building Construction and Materials" is incorporated by reference and may be inspected at any Coal Mine Safety and Health District Office, or at MSHA's Office of Standards, Regulations, and Variances, 201 12th Street South, Arlington, VA 22202-5452; 202-693-9440; or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal__register/code__of__federal__regulations/ibr__locations.html. In addition, copies of the document can be purchased from the American Society for Testing and Materials (ASTM), 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959; 610-832-9500; http://www.astm.org. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51.

Point feeding. The process of providing additional intake air to the belt air course from another intake air course through a regulator.

Return air. Air that has ventilated the last working place on any split of any working section or any worked-out area whether pillared or nonpillared. If air mixes with air that has ventilated the last working place on any split of any working section or any worked-out area, whether pillared or nonpillared, it is considered return air. For the purposes of §75.507-1, air that has been used to ventilate any working place in a coal producing section or pillared area, or air that has been used to ventilate any working face if such air is directed away from the immediate return is return air. Notwithstanding the definition of intake air, for the purpose of ventilation of structures, areas or installations that are required by this subpart D to be ventilated to return air courses, and for ventilation of seals, other air courses may be designated as return air courses by the operator only when the air in these air courses will not be used to ventilate working places or other locations, structures, installations or areas required to be ventilated with intake air.

Worked-out area. An area where mining has been completed, whether pillared or nonpillared, excluding developing entries, return air courses, and intake air courses.

[61 FR 9829, Mar. 11, 1996; 61 FR 29288, June 10, 1996, as amended at 67 FR 38386, June 4, 2002; 69 FR 17526, Apr. 2, 2004; 71 FR 16668, Apr. 3, 2006; 80 FR 52990, Sept. 2, 2015]

30 CFR §75.302

Main mine fans.

Each coal mine shall be ventilated by one or more main mine fans. Booster fans shall not be installed underground to assist main mine fans except in anthracite mines. In anthracite mines, booster fans installed in the main air current or a split of the main air current may be used provided their use is approved in the ventilation plan.

30 CFR §75.310

Installation of main mine fans.

(a) Each main mine fan shall be--

(1) Installed on the surface in an incombustible housing;

(2) Connected to the mine opening with incombustible air ducts;

(3) Equipped with an automatic device that gives a signal at the mine when the fan either slows or stops. A responsible person designated by the operator shall always be at a surface location at the mine where the signal can be seen or heard while anyone is underground. This person shall be provided with two-way communication with the working sections and work stations where persons are routinely assigned to work for the majority of a shift;

(4) Equipped with a pressure recording device or system. Mines permitted to shut down main mine fans under §75.311 and which do not have a pressure recording device installed on main mine fans shall have until June 10, 1997 to install a pressure recording device or system on all main mine fans. If a device or system other than a circular pressure recorder is used to monitor main mine fan pressure, the monitoring device or system shall provide a continuous graph or continuous chart of the pressure as a function of time. At not more than 7-day intervals, a hard copy of the continuous graph or chart shall be generated or the record of the fan pressure shall be stored electronically. When records of fan pressure are stored electronically, the system used to store these records shall be secure and not susceptible to alteration and shall be capable of storing the required data. Records of the fan pressure shall be retained at a surface location at the mine for at least 1 year and be made available for inspection by authorized representatives of the Secretary and the representative of miners;

(5) Protected by one or more weak walls or explosion doors, or a combination of weak walls and explosion doors, located in direct line with possible explosive forces;

(6) Except as provided under paragraph (e) of this section, offset by at least 15 feet from the nearest side of the mine opening unless an alternative method of protecting the fan and its associated components is approved in the ventilation plan.

(b)(1)If an electric motor is used to drive a main mine fan, the motor shall operate from a power circuit independent of all mine power circuits.

(2) If an internal combustion engine is used to drive a main mine fan--

(i) The fuel supply shall be protected against fires and explosions;

(ii) The engine shall be installed in an incombustible housing and be equipped with a remote shut-down device;

(iii) The engine and the engine exhaust system shall be located out of direct line of the air current exhausting from the mine; and

(iv) The engine exhaust shall be vented to the atmosphere so that the exhaust gases do not contaminate the mine intake air current or any enclosure.

(c) If a main mine fan monitoring system is used under §75.312, the system shall--

(1) Record, as described in paragraph (a)(4) the mine ventilating pressure;

(2) Monitor bearing temperature, revolutions per minute, vibration, electric voltage, and amperage;

(3) Provide a printout of the monitored parameters, including the mine ventilating pressure within a reasonable period, not to exceed the end of the next scheduled shift during which miners are underground; and

(4) Be equipped with an automatic device that signals when--

(i) An electrical or mechanical deficiency exists in the monitoring system; or

(ii) A sudden increase or loss in mine ventilating pressure occurs.

(5) Provide monitoring, records, printouts, and signals required by paragraphs (c)(1) through (c)(4) at a surface location at the mine where a responsible person designated by the operator is always on duty and where signals from the monitoring system can be seen or heard while anyone is underground. This person shall be provided with two-way communication with the working sections and work stations where persons are routinely assigned to work for the majority of a shift.

(d) Weak walls and explosion doors shall have cross-sectional areas at least equal to that of the entry through which the pressure from an explosion underground would be relieved. A weak wall and explosion door combination shall have a total cross-sectional area at least equal to that of the entry through which the pressure from an explosion underground would be relieved.

(e) If a mine fan is installed in line with an entry, a slope, or a shaft--

(1) The cross-sectional area of the pressure relief entry shall be at least equal to that of the fan entry;

(2) The fan entry shall be developed out of direct line with possible explosive forces;

(3) The coal or other solid material between the pressure relief entry and the fan entry shall be at least 2,500 square feet; and

(4) The surface opening of the pressure relief entry shall be not less than 15 feet nor

more than 100 feet from the surface opening of the fan entry and from the underground intersection of the fan entry and pressure relief entry.

(f) In mines ventilated by multiple main mine fans, incombustible doors shall be installed so that if any main mine fan stops and air reversals through the fan are possible, the doors on the affected fan automatically close.

[61 FR 9829, Mar. 11, 1996; as amended at 61 FR 20877, May 8, 1996]

30 CFR §75.311

Main mine fan operation.

(a) Main mine fans shall be continuously operated, except as otherwise approved in the ventilation plan, or when intentionally stopped for testing of automatic closing doors and automatic fan signal devices, maintenance or adjustment of the fan, or to perform maintenance or repair work underground that cannot otherwise be made while the fan is operating.

(b) Except as provided in paragraph (c) of this section, when a main mine fan is intentionally stopped and the ventilating quantity provided by the fan is not maintained by a back-up fan system--

(1) Only persons necessary to evaluate the effect of the fan stoppage or restart, or to perform maintenance or repair work that cannot otherwise be made while the fan is operating, shall be permitted underground;

(2) Mechanized equipment shall be shut off before stopping the fan; and

(3) Electric power circuits entering underground areas of the mine shall be de-energized.

(c) When a back-up fan system is used that does not provide the ventilating quantity provided by the main mine fan, persons may be permitted in the mine and electric power circuits may be energized as specified in the approved ventilation plan.

(d) If an unusual variance in the mine ventilation pressure is observed, or if an electrical or mechanical deficiency of a main mine fan is detected, the mine foreman or equivalent mine official, or in the absence of the mine foreman or equivalent mine official, a designated certified person acting for the mine foreman or equivalent mine official shall be notified immediately, and appropriate action or repairs shall be instituted promptly.

(e) While persons are underground, a responsible person designated by the operator shall always be at a surface location where each main mine fan signal can be seen or heard.

(f) The area within 100 feet of main mine fans and intake air openings shall be kept free of combustible material, unless alternative precautions necessary to provide protection from fire or other products of combustion are approved in the ventilation plan.

(g) If multiple mine fans are used, the mine ventilation system shall be designed and maintained to eliminate areas without air movement.

(h) Any atmospheric monitoring system operated during fan stoppages shall be intrinsically safe.

30 CFR §75.312

Main mine fan examinations and records.

(a) To assure electrical and mechanical reliability of main mine fans, each main mine fan and its associated components, including devices for measuring or recording mine ventilation pressure, shall be examined for proper operation by a trained person designated by the operator. Examinations of main mine fans shall be made at least once each day that the fan operates, unless a fan monitoring system is used. No examination is required on any day when no one, including certified persons, goes underground, except that an examination shall be completed prior to anyone entering the mine.

(b)(1) If a main mine fan monitoring system is used, a trained person designated by the operator shall--

(i) At least once each day review the data provided by the fan monitoring system to assure that the fan and the fan monitoring system are operating properly. No review is required on any day when no one, including certified persons, goes underground, except that a review of the data shall be performed prior to anyone entering the underground portion of the mine. Data reviewed should include the fan pressure, bearing temperature, revolutions per minute, vibration, electric voltage, and amperage; and

(ii) At least every 7 days—

(A) Test the monitoring system for proper operation; and

(B) Examine each main mine fan and its associated components to assure electrical and mechanical reliability of main mine fans.

(2) If the monitoring system malfunctions, the malfunction shall be corrected, or paragraph (a) of this section shall apply.

(c) At least every 31 days, the automatic fan signal device for each main mine fan shall be tested by stopping the fan. Only persons necessary to evaluate the effect of the fan stoppage or restart, or to perform maintenance or repair work that cannot otherwise be made while the fan is operating, shall be permitted underground. Notwithstanding the requirement of §75.311(b)(3), underground power may remain energized during this test provided no one, including persons identified in §75.311(b)(1), is underground. If the fan is not restarted within 15 minutes, underground power shall be de-energized and no one shall enter any underground area of the mine until the fan is restarted and an examination of the mine is conducted as described in §75.360(b) through (e) and the mine has been determined to be safe.

(d) At least every 31 days, the automatic closing doors in multiple main mine fan systems shall be tested by stopping the fan. Only persons necessary to evaluate the effect of the fan stoppage or restart, or to perform maintenance or repair work that cannot otherwise be made while the fan is operating, shall be permitted underground. Notwithstanding the provisions of §75.311, underground power may remain energized during this test provided no one, including persons identified in §75.311(b)(1), is underground. If the fan is not restarted within 15 minutes, underground power shall be de-energized and no one shall enter any underground area of the mine, until the fan is restarted and an examination of the mine is conducted as described in §75.360(b) through (e) and the mine has been determined to be safe.

(e) Circular main mine fan pressure recording charts shall be changed before the beginning of a second revolution.

(f)(1) *Certification.* Persons making main mine fan examinations shall certify by initials and date at the fan or another location specified by the operator that the examinations were made. Each certification shall identify the main mine fan examined.

(2) Persons reviewing data produced by a main mine fan monitoring system shall certify by initials and date on a printed copy of the data from the system that the review was completed. In lieu of certification on a copy of the data, the person reviewing the data may certify electronically that the review was completed. Electronic certification shall be by handwritten initials and date in a computer system so as to be secure and not susceptible to alteration.

(g)(1) *Recordkeeping.* By the end of the shift on which the examination is made, persons making main mine fan examinations shall record all uncorrected defects that may affect the operation of the fan that are not corrected by the end of that shift. Records shall be maintained in a secure book that is not susceptible to alteration or electronically in a computer system so as to be secure and not susceptible to alteration.

(2) When a fan monitoring system is used in lieu of the daily fan examination--

(i) The certified copies of data produced by fan monitoring systems shall be maintained separate from other computer-generated reports or data; and

(ii) A record shall be made of any fan monitoring system malfunctions, electrical or mechanical deficiencies in the monitoring system and any sudden increase or loss in mine ventilating pressure. The record shall be made by the end of the shift on which the review of the data is completed and shall be maintained in a secure book that is not susceptible to alteration or electronically in a computer system so as to be secure and not susceptible to alteration.

(3) By the end of the shift on which the monthly test of the automatic fan signal device or the automatic closing doors is completed, persons making these tests shall record the results of the tests. Records shall be maintained in a secure book that is not susceptible to alteration or electronically in a computer system so as to be secure and

not susceptible to alteration.

(h) *Retention period.* Records, including records of mine fan pressure and the certified copies of data produced by fan monitoring systems, shall be retained at a surface location at the mine for at least 1 year and shall be made available for inspection by authorized representatives of the Secretary and the representative of miners.

30 CFR §75.313

Main mine fan stoppage with persons underground.

(a) If a main mine fan stops while anyone is underground and the ventilating quantity provided by the fan is not maintained by a back-up fan system--

(1) Electrically powered equipment in each working section shall be de-energized;

(2) Other mechanized equipment in each working section shall be shut off; and

(3) Everyone shall be withdrawn from the working sections and areas where mechanized mining equipment is being installed or removed.

(b) If ventilation is restored within 15 minutes after a main mine fan stops, certified persons shall examine for methane in the working places and in other areas where methane is likely to accumulate before work is resumed and before equipment is energized or restarted in these areas.

(c) If ventilation is not restored within 15 minutes after a main mine fan stops--

(1) Everyone shall be withdrawn from the mine;

(2) Underground electric power circuits shall be de-energized. However, circuits necessary to withdraw persons from the mine need not be de-energized if located in areas or haulageways where methane is not likely to migrate to or accumulate. These circuits shall be de-energized as persons are withdrawn; and

(3) Mechanized equipment not located on working sections shall be shut off. However, mechanized equipment necessary to withdraw persons from the mine need not be shut off if located in areas where methane is not likely to migrate to or accumulate.

(d)(1) When ventilation is restored--

(i) No one other than designated certified examiners shall enter any underground area of the mine until an examination is conducted as described in §75.360(b) through (e) and the area has been determined to be safe. Designated certified examiners shall enter the underground area of the mine from which miners have been withdrawn only after the fan has operated for at least 15 minutes unless a longer period of time is specified in the approved ventilation plan.

(ii) Underground power circuits shall not be energized and nonpermissible mechanized equipment shall not be started or operated in an area until an examination is conducted as described in §75.360(b) through (e) and the area has been determined to be safe, except that designated certified examiners may use nonpermissible transportation equipment in intake airways to facilitate the making of the required examination.

(2) If ventilation is restored to the mine before miners reach the surface, the miners may return to underground working areas only after an examination of the areas is made by a certified person and the areas are determined to be safe.

(e) Any atmospheric monitoring system operated during fan stoppages shall be intrinsically safe.

(f) Any electrical refuge alternative components exposed to the mine atmosphere shall be approved as intrinsically safe for use during fan stoppages. Any electrical refuge alternative components located inside the refuge alternative shall be either approved as intrinsically safe or approved as permissible for use during fan stoppages.

[61 FR 9829, Mar. 11, 1996, as amended at 73 FR 80697, Dec. 31, 2008]

30 CFR §75.320

Air quality detectors and measurement devices.

(a) Tests for methane shall be made by a qualified person with MSHA approved detectors that are maintained in permissible and proper operating condition and calibrated with a known methane-air mixture at least once every 31 days.

(b) Tests for oxygen deficiency shall be made by a qualified person with MSHA approved oxygen detectors that are maintained in permissible and proper operating condition and that can detect 19.5 percent oxygen with an accuracy of ±0.5 percent. The oxygen detectors shall be calibrated at the start of each shift that the detectors will be used.

(c) Handheld devices that contain electrical components and that are used for measuring air velocity, carbon monoxide, oxides of nitrogen, and other gases shall be approved and maintained in permissible and proper operating condition.

(d) An oxygen detector approved by MSHA shall be used to make tests for oxygen deficiency required by the regulations in this part. Permissible flame safety lamps may only be used as a supplementary testing device.

(e) Maintenance of instruments required by paragraphs (a) through (d) of this section shall be done by persons trained in such maintenance.

30 CFR §75.321

Air quality.

(a)(1) The air in areas where persons work or travel, except as specified in paragraph of this section, shall contain at least 19.5 percent oxygen and not more than 0.5 percent carbon dioxide, and the volume and velocity of the air current in these areas shall be sufficient to dilute, render harmless, and carry away flammable, explosive, noxious, and harmful gases, dusts, smoke, and fumes.

(2) The air in areas of bleeder entries and worked-out areas where persons work or travel shall contain at least 19.5 percent oxygen, and carbon dioxide levels shall not exceed 0.5 percent time weighted average and 3.0 percent short term exposure limit.

(b) Notwithstanding the provisions of §75.322, for the purpose of preventing explosions from gases other than methane, the following gases shall not be permitted to accumulate in excess of the concentrations listed below:

(1) Carbon monoxide (CO)--2.5 percent

(2) Hydrogen (H(sub)2)--.80 percent

(3) Hydrogen sulfide (H(sub)2S)--.80 percent

(4) Acetylene (C(sub)2H(sub)2)--.40 percent

(5) Propane (C(sub)3H(sub)8)--.40 percent

(6) MAPP (methyl-acetylene-propylene-propodiene)--.30 percent

30 CFR §75.322

Harmful quantities of noxious gases.

Concentrations of noxious or poisonous gases, other than carbon dioxide, shall not exceed the threshold limit values (TLV) as specified and applied by the American Conference of Governmental Industrial Hygienists in "Threshold Limit Values for Substance in Workroom Air" (1972). Detectors or laboratory analysis of mine air samples shall be used to determine the concentrations of harmful, noxious, or poisonous gases. This incorporation by reference has been approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies are available from MSHA's Office of Standards, Regulations, and Variances, 201 12th Street South, Arlington, VA 22202-5452; 202-693-9440; and at every MSHA Coal Mine Safety and Health District Office. The material is available for examination at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.

[80 FR 52991, Sept. 2, 2015]

30 CFR §75.323

Actions for excessive methane.

(a) *Location of tests.* Tests for methane concentrations under this section shall be made at least 12 inches from the roof, face, ribs, and floor.

(b) *Working places and intake air courses.*

(1) When 1.0 percent or more methane is present in a working place or an intake air course, including an air course in which a belt conveyor is located, or in an area where mechanized mining equipment is being installed or removed--

(i) Except intrinsically safe atmospheric monitoring systems (AMS), electrically powered equipment in the affected area shall be de-energized, and other mechanized equipment shall be shut off;

(ii) Changes or adjustments shall be made at once to the ventilation system to reduce the concentration of methane to less than 1.0 percent; and

(iii) No other work shall be permitted in the affected area until the methane concentration is less than 1.0 percent.

(2) When 1.5 percent or more methane is present in a working place or an intake air course, including an air course in which a belt conveyor is located, or in an area where mechanized mining equipment is being installed or removed--

(i) Everyone except those persons referred to in §104(c) of the Act shall be withdrawn from the affected area; and

(ii) Except for intrinsically safe AMS, electrically powered equipment in the affected area shall be disconnected at the power source.

(c) *Return air split.*

(1) When 1.0 percent or more methane is present in a return air split between the last working place on a working section and where that split of air meets another split of air, or the location at which the split is used to ventilate seals or worked- out areas changes or adjustments shall be made at once to the ventilation system to reduce the concentration of methane in the return air to less than 1.0 percent.

(2) When 1.5 percent or more methane is present in a return air split between the last working place on a working section and where that split of air meets another split of air, or the location where the split is used to ventilate seals or worked-out areas--

(i) Everyone except those persons referred to in §104(c) of the Act shall be

withdrawn from the affected area;

(ii) Other than intrinsically safe AMS, equipment in the affected area shall be de-energized, electric power shall be disconnected at the power source, and other mechanized equipment shall be shut off; and

(iii) No other work shall be permitted in the affected area until the methane concentration in the return air is less than 1.0 percent.

(d) *Return air split alternative.* (1) The provisions of this paragraph apply if--

(i) The quantity of air in the split ventilating the active workings is at least 27,000 cubic feet per minute in the last open crosscut or the quantity specified in the approved ventilation plan, whichever is greater;

(ii) The methane content of the air in the split is continuously monitored during mining operations by an AMS that gives a visual and audible signal on the working section when the methane in the return air reaches 1.5 percent, and the methane content is monitored as specified in §75.351; and

(iii) Rock dust is continuously applied with a mechanical duster to the return air course during coal production at a location in the air course immediately outby the most inby monitoring point.

(2) When 1.5 percent or more methane is present in a return air split between a point in the return opposite the section loading point and where that split of air meets another split of air or where the split of air is used to ventilate seals or worked-out areas--

(i) Changes or adjustments shall be made at once to the ventilation system to reduce the concentration of methane in the return air below 1.5 percent;

(ii) Everyone except those persons referred to in §104(c) of the Act shall be withdrawn from the affected area;

(iii) Except for intrinsically safe AMS, equipment in the affected area shall be de-energized, electric power shall be disconnected at the power source, and other mechanized equipment shall be shut off; and

(iv) No other work shall be permitted in the affected area until the methane concentration in the return air is less than 1.5 percent.

(e) *Bleeders and other return air courses.* The concentration of methane in a bleeder split of air immediately before the air in the split joins another split of air, or in a return air course other than as described in paragraphs (c) and (d) of this section, shall not exceed 2.0 percent.

30 CFR §75.324

Intentional changes in the ventilation system.

(a) A person designated by the operator shall supervise any intentional change in ventilation that--

(1) Alters the main air current or any split of the main air current in a manner that could materially affect the safety or health of persons in the mine; or

(2) Affects section ventilation by 9,000 cubic feet per minute of air or more in bituminous or lignite mines, or 5,000 cubic feet per minute of air or more in anthracite mines.

(b) Intentional changes shall be made only under the following conditions:

(1) Electric power shall be removed from areas affected by the ventilation change and mechanized equipment in those areas shall be shut off before the ventilation change begins.

(2) Only persons making the change in ventilation shall be in the mine.

(3) Electric power shall not be restored to the areas affected by the ventilation change and mechanized equipment shall not be restarted until a certified person has examined these areas for methane accumulation and for oxygen deficiency and has determined that the areas are safe.

30 CFR §75.325

Air quantity.

(a)(1) In bituminous and lignite mines the quantity of air shall be at least 3,000 cubic feet per minute reaching each working face where coal is being cut, mined, drilled for blasting, or loaded. When a greater quantity is necessary to dilute, render harmless, and carry away flammable, explosive, noxious, and harmful gases, dusts, smoke, and fumes, this quantity shall be specified in the approved ventilation plan. A minimum air quantity may be required to be specified in the approved ventilation plan for other working places or working faces.

(2) The quantity of air reaching the working face shall be determined at or near the face end of the line curtain, ventilation tubing, or other ventilation control device. If the curtain, tubing, or device extends beyond the last row of permanent roof supports, the quantity of air reaching the working face shall be determined behind the line curtain or in the ventilation tubing at or near the last row of permanent supports. When machine-mounted dust collectors are used in conjunction with blowing face ventilation systems, the quantity of air reaching the working face shall be determined with the dust collector turned off.

(3) If machine mounted dust collectors or diffuser fans are used, the approved ventilation plan shall specify the operating volume of the dust collector or diffuser fan.

(b) In bituminous and lignite mines, the quantity of air reaching the last open crosscut of each set of entries or rooms on each working section and the quantity of air reaching the intake end of a pillar line shall be at least 9,000 cubic feet per minute unless a greater quantity is required to be specified in the approved ventilation plan. This minimum also applies to sections which are not operating but are capable of producing coal by simply energizing the equipment on the section.

(c) In longwall and shortwall mining systems—

(1) The quantity of air shall be at least 30,000 cubic feet per minute reaching the working face of each longwall, unless the operator demonstrates that a lesser air quantity will maintain continual compliance with applicable methane and respirable dust standards. This lesser quantity shall be specified in the approved ventilation plan. A quantity greater than 30,000 cubic feet per minute may be required to be specified in the approved ventilation plan.

(2) The velocity of air that will be provided to control methane and respirable dust in accordance with applicable standards on each longwall or shortwall and the locations where these velocities will be provided shall be specified in the approved ventilation plan. The locations specified shall be at least 50 feet but no more than 100 feet from the headgate and tailgate, respectively.

(d) Ventilation shall be maintained during installation and removal of mechanized mining equipment. The approved ventilation plan shall specify the minimum quantity of air, the locations where this quantity will be provided and the ventilation controls required.

(e) In anthracite mines, the quantity of air shall be as follows:

(1) At least 1,500 cubic feet per minute reaching each working face where coal is being mined, unless a greater quantity is required to be specified in the approved ventilation plan.

(2) At least 5,000 cubic feet per minute passing through the last open crosscut in each set of entries or rooms and at the intake end of any pillar line, unless a greater quantity is required to be specified in the approved ventilation plan.

(3) When robbing areas where air currents cannot be controlled and air measurements cannot be obtained, the air shall have perceptible movement.

(f) The minimum ventilating air quantity for an individual unit of diesel-powered equipment being operated shall be at least that specified on the approval plate for that equipment. Such air quantity shall be maintained—

(1) In any working place where the equipment is being operated;

(2) At the section loading point during any shift the equipment is being operated on the working section;

(3) In any entry where the equipment is being operated outby the section loading point in areas of the mine developed on or after April 25, 1997;

(4) In any air course with single or multiple entries where the equipment is being operated outby the section loading point in areas of the mine developed prior to April 25, 1997; and

(5) At any other location required by the district manager and specified in the approved ventilation plan.

(g) The minimum ventilating air quantity where multiple units of diesel-powered equipment are operated on working sections and in areas where mechanized mining equipment is being installed or removed must be at least the sum of that specified on the approval plates of all the diesel-powered equipment on the working section or in the area where mechanized mining equipment is being installed or removed. The minimum ventilating air quantity shall be specified in the approved ventilation plan. For working sections such air quantity must be maintained—

(1) In the last open crosscut of each set of entries or rooms in each working section;

(2) In the intake, reaching the working face of each longwall; and

(3) At the intake end of any pillar line.

(h) The following equipment may be excluded from the calculations of ventilating air quantity under paragraph (g) if such equipment exclusion is approved by the district manager and specified in the ventilation plan:

(1) Self-propelled equipment meeting the requirements of §75.1908(b);

(2) Equipment that discharges its exhaust into intake air that is coursed directly to a return air course;

(3) Equipment that discharges its exhaust directly into a return air course; and

(4) Other equipment having duty cycles such that the emissions would not significantly affect the exposure of miners.

(i) A ventilating air quantity that is less than what is required by paragraph (g) of this section may be approved by the district manager in the ventilation plan based upon the results of sampling that demonstrate that the lesser air quantity will maintain continuous compliance with applicable TLV®'s.

(j) If during sampling required by §70.1900(c) of this subchapter the ventilating air is found

to contain concentrations of CO or NO2 in excess of the action level specified by §70.1900(c), higher action levels may be approved by the district manager based on the results of sampling that demonstrate that a higher action level will maintain continuous compliance with applicable TLV®'s. Action levels other than those specified in §70.1900(c) shall be specified in the approved ventilation plan.

(k) As of November 25, 1997 the ventilating air quantity required where diesel-powered equipment is operated shall meet the requirements of paragraphs (f) through (j) of this section. Mine operators utilizing diesel-powered equipment in underground coal mines shall submit to the appropriate MSHA district manager a revised ventilation plan or appropriate amendments to the existing plan, in accordance with §75.371, which implement the requirements of paragraphs (f) through (j) of this section.

[61 FR 9828, Mar. 11, 1996; 61 FR 26442, May 28, 1996; 61 FR 29288, June 10, 1996, as amended at 61 FR 55526, Oct. 25, 1996; 62 FR 34641, June 27, 1997; 79 FR 24987, May 1, 2014]

30 CFR §75.326

Mean entry air velocity.

In exhausting face ventilation systems, the mean entry air velocity shall be at least 60 feet per minute reaching each working face where coal is being cut, mined, drilled for blasting, or loaded, and to any other working places as required in the approved ventilation plan. A lower mean entry air velocity may be approved in the ventilation plan if the lower velocity will maintain methane and respirable dust concentrations below the applicable levels. Mean entry air velocity shall be determined at or near the inby end of the line curtain, ventilation tubing, or other face ventilation control devices.
[61 FR 9828, Mar. 11, 1996; 61 FR 29288, June 10, 1996]

30 CFR §75.327

Air courses and trolley haulage systems.

(a) In any mine opened on or after March 30, 1970, or in any new working section of a mine opened before that date, where trolley haulage systems are maintained and where trolley wires or trolley feeder wires are installed, an authorized representative of the Secretary shall require enough entries or rooms as intake air courses to limit the velocity of air currents in the haulageways to minimize the hazards of fires and dust explosions in the haulageways.

(b) Unless the district manager approves a higher velocity, the velocity of the air current in the trolley haulage entries shall be limited to not more than 250 feet per minute. A higher air velocity may be required to limit the methane content in these haulage entries or elsewhere in the mine to less than 1.0 percent and provide an adequate supply of oxygen.

30 CFR §75.330

Face ventilation control devices.

(a) Brattice cloth, ventilation tubing and other face ventilation control devices shall be made of flame-resistant material approved by MSHA.

(b)(1) Ventilation control devices shall be used to provide ventilation to dilute, render harmless, and to carry away flammable, explosive, noxious, and harmful gases, dusts, smoke, and fumes--

(i) To each working face from which coal is being cut, mined, drilled for blasting, or loaded; and

(ii) To any other working places as required by the approved ventilation plan.

(2) These devices shall be installed at a distance no greater than 10 feet from the area of deepest penetration to which any portion of the face has been advanced unless an alternative distance is specified and approved in the ventilation plan. Alternative distances specified shall be capable of maintaining concentrations of respirable dust, methane, and other harmful gases, in accordance with the levels specified in the applicable sections of this chapter.

(c) When the line brattice or any other face ventilation control device is damaged to an extent that ventilation of the working face is inadequate, production activities in the working place shall cease until necessary repairs are made and adequate ventilation is restored.

[61 FR 9828, Mar. 11, 1996; 61 FR 29288, June 10, 1996]

30 CFR §75.331

Auxiliary fans and tubing.

(a) When auxiliary fans and tubing are used for face ventilation, each auxiliary fan shall be--

(1) Permissible, if the fan is electrically operated;

(2) Maintained in proper operating condition;

(3) De-energized or shut off when no one is present on the working section; and

(4) Located and operated to avoid recirculation of air.

(b) If a deficiency exists in any auxiliary fan system, the deficiency shall be corrected or the auxiliary fan shall be de-energized immediately.

(c) If the air passing through an auxiliary fan or tubing contains 1.0 percent or more methane, power to electrical equipment in the working place and to the auxiliary fan shall be de-energized, and other mechanized equipment in the working place shall be shut off until the methane concentration is reduced to less than 1.0 percent.

(d) When an auxiliary fan is stopped--

(1) Line brattice or other face ventilation control devices shall be used to maintain ventilation to affected faces; and

(2) Electrical equipment in the affected working places shall be disconnected at the power source, and other mechanized equipment shall be shut off until ventilation to the working place is restored.

30 CFR §75.332

Working sections and working places.

(a)(1) Each working section and each area where mechanized mining equipment is being installed or removed, shall be ventilated by a separate split of intake air directed by overcasts, undercasts or other permanent ventilation controls.

(2) When two or more sets of mining equipment are simultaneously engaged in cutting, mining, or loading coal or rock from working places within the same working section, each set of mining equipment shall be on a separate split of intake air.

(3) For purposes of this section, a set of mining equipment includes a single loading machine, a single continuous mining machine, or a single longwall or shortwall mining machine.

(b)(1) Air that has passed through any area that is not examined under §§75.360, 75.361 or §75.364 of this subpart, or through an area where second mining has been done shall not be used to ventilate any working place. Second mining is intentional retreat mining where pillars have been wholly or partially removed, regardless of the amount of recovery obtained.

(2) Air that has passed by any opening of any unsealed area that is not examined under §§75.360, 75.361 or §75.364 of this subpart, shall not be used to ventilate any working place.

30 CFR §75.333

Ventilation controls.

(a) For purposes of this section, "doors" include any door frames.

(b) Permanent stoppings or other permanent ventilation control devices constructed after November 15, 1992, shall be built and maintained--

(1) Between intake and return air courses, except temporary controls may be used in rooms that are 600 feet or less from the centerline of the entry from which the room was developed including where continuous face haulage systems are used in such rooms. Unless otherwise approved in the ventilation plan, these stoppings or controls shall be maintained to and including the third connecting crosscut outby the working face;

(2) To separate belt conveyor haulageways from return air courses, except where belt entries in areas of mines developed before March 30, 1970, are used as return air courses;

(3) To separate belt conveyor haulageways from intake air courses when the air in the intake air courses is used to provide air to active working places. Temporary ventilation controls may be used in rooms that are 600 feet or less from the centerline of the entry from which the rooms were developed including where continuous face haulage systems are used in such rooms. When continuous face haulage systems are used, permanent stoppings or other permanent ventilation control devices shall be built and maintained to the outby most point of travel of the dolly or 600 feet from the point of deepest penetration in the conveyor belt entry, whichever distance is closer to the point of deepest penetration, to separate the continuous haulage entry from the intake entries;

(4) To separate the primary escapeway from belt and trolley haulage entries, as required by §75.380(g). For the purposes of §75.380(g), the loading point for a continuous haulage system shall be the outby most point of travel of the dolly or 600 feet from the point of deepest penetration, whichever distance is less; and

(5) In return air courses to direct air into adjacent worked-out areas.

(c) Personnel doors shall be constructed of noncombustible material and shall be of sufficient strength to serve their intended purpose of maintaining separation and permitting travel between air courses, and shall be installed as follows in permanent stoppings constructed after November 15, 1992:

(1) The distance between personnel doors shall be no more than 300 feet in seam heights below 48 inches and 600 feet in seam heights 48 inches or higher.

(2) The location of all personnel doors in stoppings along escapeways shall be clearly marked so that the doors may be easily identified by anyone traveling in the escapeway and in the entries on either side of the doors.

(3) When not in use, personnel doors shall be closed.

(d) Doors, other than personnel doors, constructed after November 15, 1992, that are used in lieu of permanent stoppings or to control ventilation within an air course shall be:

(1) Made of noncombustible material or coated on all accessible surfaces with flame-retardant materials having a flame-spread index of 25 or less, as tested under ASTM E162-87, "Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source." This publication is incorporated by reference and may be inspected at any MSHA Coal Mine Safety and Health District Office, or at MSHA's Office of Standards, Regulations, and Variances, 201 12th Street South, Arlington, VA 22202-5452; 202-693-9440; and at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal__register/code__of__federal__regulations/ibr__locations.html. In addition, copies of the document can be purchased from the American Society for Testing and Materials (ASTM), 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959; 610-832-9500; http://www.astm.org. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51.

(2) Of sufficient strength to serve their intended purpose of maintaining separation and permitting travel between or within air courses or entries.

(3) Installed in pairs to form an airlock. When an airlock is used, one side of the airlock shall remain closed. When not in use, both sides shall be closed.

(e)(1)(i) Except as provided in paragraphs (e)(2), (3), and (4) of this section, all overcasts, undercasts, shaft partitions, permanent stoppings, and regulators, installed after June 10, 1996, shall be constructed in a traditionally accepted method and of materials that have been demonstrated to perform adequately or in a method and of materials that have been tested and shown to have a minimum strength equal to or greater than the traditionally accepted in-mine controls. Tests may be performed under ASTM E72-80, "Standard Methods of Conducting Strength Tests of Panels for Building Construction" (Section 12-Transverse Load-Specimen Vertical, load, only), or the operator may conduct comparative in-mine tests. In-mine tests shall be designed to demonstrate the comparative strength of the proposed construction and a traditionally accepted in-mine control. The publication ASTM E72-80, "Standard Methods of Conducting Strength Tests of Panels for Building Construction," is incorporated by reference and may be inspected at any MSHA Coal Mine Safety and Health District Office, or at MSHA's Office of Standards, Regulations, and Variances, 201 12th Street South, Arlington, VA 22202-5452; 202-693-9440; and at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html. In addition, copies of the document can be purchased from the American Society for Testing and Materials (ASTM), 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959; 610-832-9500; http://www.astm.org. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51.

(ii) All overcasts, undercasts, shaft partitions, permanent stoppings, and regulators, installed after November 15, 1992, shall be constructed of noncombustible material. Materials that are suitable for the construction of overcasts, undercasts, shaft partitions, permanent stoppings, and regulators include concrete, concrete block,

brick, cinder block, tile, or steel. No ventilation controls installed after November 15, 1992, shall be constructed of aluminum.

(2) In anthracite mines, permanent stoppings may be constructed of overlapping layers of hardwood mine boards, if the stoppings are a minimum 2 inches thick.

(3) When timbers are used to create permanent stoppings in heaving or caving areas, the stoppings shall be coated on all accessible surfaces with a flame-retardant material having a flame-spread index of 25 or less, as tested under ASTM E162-87, "Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source." This publication is incorporated by reference and may be inspected at any MSHA Coal Mine Safety and Health District Office, or at MSHA's Office of Standards, Regulations, and Variances, 201 12th Street South, Arlington, VA 22202-5452; 202-693-9440; and at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html. In addition, copies of the document can be purchased from the American Society for Testing and Materials (ASTM), 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959; 610-832-9500; http://www.astm.org. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51.

(4) In anthracite mines, doors and regulators may be constructed of overlapping layers of hardwood boards, if the doors, door frames, and regulators are a minimum 2 inches thick.

(f) When sealants are applied to ventilation controls, the sealant shall have a flame-spread index of 25 or less under ASTM E162-87, "Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source." This publication is incorporated by reference and may be inspected at any MSHA Coal Mine Safety and Health District Office, or at MSHA's Office of Standards, Regulations, and Variances, 201 12th Street South, Arlington, VA 22202-5452; 202-693-9440; and at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html. In addition, copies of the document can be purchased from the American Society for Testing and Materials (ASTM), 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959; 610-832-9500; http://www.astm.org. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51.

(g) Before mining is discontinued in an entry or room that is advanced more than 20 feet from the inby rib, a crosscut shall be made or line brattice shall be installed and maintained to provide adequate ventilation. When conditions such as methane liberation warrant a distance less than 20 feet, the approved ventilation plan shall specify the location of such rooms or entries and the maximum distance they will be developed before a crosscut is made or line brattice is installed.

(h) All ventilation controls, including seals, shall be maintained to serve the purpose for which they were built.

[61 FR 9829, Mar. 11, 1996; 61 FR 20877, May 8, 1996; 61 FR 26442, May 28, 1996; 61 FR 29288, 29289, June 10, 1996, as amended at 67 FR 38386, June 4, 2002; 71 FR 16668, Apr. 3, 2006; 73 FR 80612, Dec. 31, 2008; 80 FR 52991, Sept. 2, 2015]

30 CFR §75.334

Worked-out areas and areas where pillars are being recovered.

(a) Worked-out areas where no pillars have been recovered shall be--

(1) Ventilated so that methane-air mixtures and other gases, dusts, and fumes from throughout the worked-out areas are continuously diluted and routed into a return air course or to the surface of the mine; or

(2) Sealed.

(b)(1) During pillar recovery a bleeder system shall be used to control the air passing through the area and to continuously dilute and move methane-air mixtures and other gases, dusts, and fumes from the worked-out area away from active workings and into a return air course or to the surface of the mine.

(2) After pillar recovery a bleeder system shall be maintained to provide ventilation to the worked-out area, or the area shall be sealed.

(c) The approved ventilation plan shall specify the following:

(1) The design and use of bleeder systems;

(2) The means to determine the effectiveness of bleeder systems;

(3) The means for adequately maintaining bleeder entries free of obstructions such as roof falls and standing water; and

(4) The location of ventilating devices such as regulators, stoppings and bleeder connectors used to control air movement through the worked-out area.

(d) If the bleeder system used does not continuously dilute and move methane-air mixtures and other gases, dusts, and fumes away from worked-out areas into a return air course or to the surface of the mine, or it cannot be determined by examinations or evaluations under §75.364 that the bleeder system is working effectively, the worked-out area shall be sealed.

(e) Each mining system shall be designed so that each worked-out area can be sealed. The approved ventilation plan shall specify the location and the sequence of construction of

proposed seals.

(f) In place of the requirements of paragraphs (a) and (b) of this section, for mines with a demonstrated history of spontaneous combustion, or that are located in a coal seam determined to be susceptible to spontaneous combustion, the approved ventilation plan shall specify the following:

(1) Measures to detect methane, carbon monoxide, and oxygen concentrations during and after pillar recovery, and in worked-out areas where no pillars have been recovered, to determine if the areas must be ventilated or sealed.

(2) Actions that will be taken to protect miners from the hazards of spontaneous combustion.

(3) If a bleeder system will not be used, the methods that will be used to control spontaneous combustion, accumulations of methane-air mixtures, and other gases, dusts, and fumes in the worked-out area.

30 CFR §75.335

Seal strengths, design applications, and installation.

(a) *Seal strengths*. Seals constructed on or after October 20, 2008 shall be designed, constructed, and maintained to withstand—

(1)(i) At least 50-psi overpressure when the atmosphere in the sealed area is monitored and maintained inert and designed using a pressure-time curve with an instantaneous overpressure of at least 50 psi. A minimum overpressure of at least 50 psi shall be maintained for at least four seconds then released instantaneously.

(ii) Seals constructed to separate the active longwall panel from the longwall panel previously mined shall be designed using a pressure-time curve with a rate of pressure rise of at least 50 psi in 0.1 second. A minimum overpressure of at least 50 psi shall be maintained; or

(2)(i) Overpressures of at least 120 psi if the atmosphere in the sealed area is not monitored, is not maintained inert, the conditions in paragraphs (a)(3)(i) through (iii) of this section are not present, and the seal is designed using a pressure-time curve with an instantaneous overpressure of at least 120 psi. A minimum overpressure of 120 psi shall longwall

(ii) Seals constructed to separate the active longwall panel from the longwall panel previously mined shall be designed using a pressure-time curve with a rate of pressure rise of 120 psi in 0.25 second. A minimum overpressure of 120 psi shall be maintained; or

(3) Overpressures greater than 120 psi if the atmosphere in the sealed area is not

monitored and is not maintained inert, and

(i) The atmosphere in the sealed area is likely to contain homogeneous mixtures of methane between 4.5 percent and 17.0 percent and oxygen exceeding 17.0 percent throughout the entire area;

(ii) Pressure piling could result in overpressures greater than 120 psi in the area to be sealed; or

(iii) Other conditions are encountered, such as the likelihood of a detonation in the area to be sealed.

(iv) Where the conditions in paragraphs (a)(3)(i), (ii), or (iii) of this section are encountered, the mine operator shall revise the ventilation plan to address the potential hazards. The plan shall include seal strengths sufficient to address such conditions.

(b) *Seal design applications.* Seal design applications from seal manufacturers or mine operators shall be in accordance with paragraph (b)(1) or (2) of this section and submitted for approval to MSHA's Office of Technical Support, Pittsburgh Safety and Health Technology Center, 626 Cochrans Mill Road, Building 151, Pittsburgh, PA 15236-3611.

(1) An engineering design application shall—

(i) Address gas sampling pipes, water drainage systems, methods to reduce air leakage, pressure-time curve, fire resistance characteristics, flame spread index, entry size, engineering design and analysis, elasticity of design, material properties, construction specifications, quality control, design references, and other information related to seal construction;

(ii) Be certified by a professional engineer that the design of the seal is in accordance with current, prudent engineering practices and is applicable to conditions in an underground coal mine; and

(iii) Include a summary of the installation procedures related to seal construction; or

(2) Each application based on full-scale explosion tests or equivalent means of physical testing shall address the following requirements to ensure that a seal can reliably meet the seal strength requirements:

(i) Certification by a professional engineer that the testing was done in accordance with current, prudent engineering practices for construction in a coal mine;

(ii) Technical information related to the methods and materials;

(iii) Supporting documentation;

(iv) An engineering analysis to address differences between the seal support during test

conditions and the range of conditions in a coal mine; and

(v) A summary of the installation procedures related to seal construction.

(3) MSHA will notify the applicant if additional information or testing is required. The applicant shall provide this information, arrange any additional or repeat tests, and provide prior notification to MSHA of the location, date, and time of such test(s).

(4) MSHA will notify the applicant, in writing, whether the design is approved or denied. If the design is denied, MSHA will specify, in writing, the deficiencies of the application, or necessary revisions.

(5) Once the seal design is approved, the approval holder shall promptly notify MSHA, in writing, of all deficiencies of which they become aware.

(c) *Seal installation approval.* The installation of the approved seal design shall be subject to approval in the ventilation plan. The mine operator shall—

(1) Retain the seal design approval and installation information for as long as the seal is needed to serve the purpose for which it was built.

(2) Designate a professional engineer to conduct or have oversight of seal installation and certify that the provisions in the approved seal design specified in this section have been addressed and are applicable to conditions at the mine. A copy of the certification shall be submitted to the District Manager with the information provided in paragraph (c)(3) of this section and a copy of the certification shall be retained for as long as the seal is needed to serve the purpose for which it was built.

(3) Provide the following information for approval in the ventilation plan—

(i) The MSHA Technical Support Approval Number;

(ii) A summary of the installation procedures;

(iii) The mine map of the area to be sealed and proposed seal locations that include the deepest points of penetration prior to sealing. The mine map shall be certified by a professional engineer or a professional land surveyor.

(iv) Specific mine site information, including—

(A) Type of seal;

(B) Safety precautions taken prior to seal achieving design strength;

(C) Methods to address site-specific conditions that may affect the strength and applicability of the seal including set-back distances;

(D) Site preparation;

(E) Sequence of seal installations;

(F) Projected date of completion of each set of seals;

(G) Supplemental roof support inby and outby each seal;

(H) Water flow estimation and dimensions of the water drainage system through the seals;

(I) Methods to ventilate the outby face of seals once completed;

(J) Methods and materials used to maintain each type of seal;

(K) Methods to address shafts and boreholes in the sealed area;

(L) Assessment of potential for overpressures greater than 120 psi in sealed area;

(M) Additional sampling locations; and

(N) Additional information required by the District Manager.

[73 FR 21206, Apr. 18, 2008, as amended at 80 FR 52982, Sept. 2, 2015]

30 CFR §75.336

Sampling and monitoring requirements.

(a) A certified person as defined in §75.100 shall monitor atmospheres of sealed areas. Sealed areas shall be monitored, whether ingassing or outgassing, for methane and oxygen concentrations and the direction of leakage.

(1) Each sampling pipe and approved sampling location shall be sampled at least every 24 hours.

(i) Atmospheres with seals of 120 psi or greater shall be sampled until the design strength is reached for every seal used to seal the area.

(ii) Atmospheres with seals less than 120 psi constructed before October 20, 2008 shall be monitored for methane and oxygen concentrations and maintained inert. The operator may request that the District Manager approve different sampling locations and frequencies in the ventilation plan, provided at least one sample is taken at each set of seals at least every 7 days.

(iii) Atmospheres with seals less than 120 psi constructed after October 20, 2008 shall be monitored for methane and oxygen concentrations and maintained inert. The

operator may request that the District Manager approve different sampling locations and frequencies in the ventilation plan after a minimum of 14 days and after the seal design strength is reached, provided at least one sample is taken at each set of seals at least every 7 days.

(2) The mine operator shall evaluate the atmosphere in the sealed area to determine whether sampling through the sampling pipes in seals and approved locations provides appropriate sampling locations of the sealed area. The mine operator shall make the evaluation immediately after the minimum 14-day required sampling, if the mine ventilation system is reconfigured, if changes occur that adversely affect the sealed area, or if the District Manager requests an evaluation. When the results of the evaluations indicate the need for additional sampling locations, the mine operator shall provide the additional locations and have them approved in the ventilation plan. The District Manager may require additional sampling locations and frequencies in the ventilation plan.

(3) Mine operators with an approved ventilation plan addressing spontaneous combustion pursuant to §75.334(f) shall sample the sealed atmosphere in accordance with the ventilation plan.

(4) The District Manager may approve in the ventilation plan the use of a continuous monitoring system in lieu of monitoring provisions in this section.

(b)(1) Except as provided in §75.336(d), the atmosphere in the sealed area is considered inert when the oxygen concentration is less than 10.0 percent or the methane concentration is less than 3.0 percent or greater than 20.0 percent.

(2) Immediate action shall be taken by the mine operator to restore an inert sealed atmosphere behind seals with strengths less than 120 psi. Until the atmosphere in the sealed area is restored to an inert condition, the sealed atmosphere shall be monitored at each sampling pipe and approved location at least once every 24 hours.

(c) Except as provided in §75.336(d), when a sample is taken from the sealed atmosphere with seals of less than 120 psi and the sample indicates that the oxygen concentration is 10 percent or greater and methane is between 4.5 percent and 17 percent, the mine operator shall immediately take an additional sample and then immediately notify the District Manager. When the additional sample indicates that the oxygen concentration is 10 percent or greater and methane is between 4.5 percent and 17 percent, persons shall be withdrawn from the affected area which is the entire mine or other affected area identified by the operator and approved by the District Manager in the ventilation plan, except those persons referred to in §104(c) of the Act. The operator may identify areas in the ventilation plan to be approved by the District Manager where persons may be exempted from withdrawal. The operator's request shall address the location of seals in relation to: Areas where persons work and travel in the mine; escapeways and potential for damage to the escapeways; and ventilation systems and controls in areas where persons work or travel and where ventilation is used for escapeways. The operator's request shall also address the gas concentration of other sampling locations in the sealed area and other required information. Before miners reenter the mine, the mine operator shall have a ventilation plan revision

approved by the District Manager specifying the actions to be taken.

(d) In sealed areas with a demonstrated history of carbon dioxide or sealed areas where inert gases have been injected, the operator may request that the District Manager approve in the ventilation plan an alternative method to determine if the sealed atmosphere is inert and when miners have to be withdrawn. The mine operator shall address in the ventilation plan the specific levels of methane, carbon dioxide, nitrogen and oxygen; the sampling methods and equipment used; and the methods to evaluate these concentrations underground at the seal.

(e) *Recordkeeping.* (1) The certified person shall promptly record each sampling result including the location of the sampling points, whether ingassing or outgassing, and oxygen and methane concentrations. The results of oxygen and methane samples shall be recorded as the percentage of oxygen and methane measured by the certified person and any hazardous condition found in accordance with §75.363.

(2) The mine operator shall retain sampling records at the mine for at least one year from the date of the sampling.

[73 FR 21207, Apr. 18, 2008; 73 FR 27730, May 14, 2008]

30 CFR §75.337

Construction and repair of seals.

(a) The mine operator shall maintain and repair seals to protect miners from hazards of sealed areas.

(b) Prior to sealing, the mine operator shall—

(1) Remove insulated cables, batteries, and other potential electric ignition sources from the area to be sealed when constructing seals, unless it is not safe to do so. If ignition sources cannot safely be removed, seals must be constructed to at least 120 psi;

(2) Remove metallic objects through or across seals; and

(3) Breach or remove all stoppings in the first crosscut inby the seals immediately prior to sealing the area.

(c) A certified person designated by the mine operator shall directly supervise seal construction and repair and—

(1) Examine each seal site immediately prior to construction or repair to ensure that the site is in accordance with the approved ventilation plan;

(2) Examine each seal under construction or repair during each shift to ensure that the seal is being constructed or repaired in accordance with the approved ventilation plan;

(3) Examine each seal upon completion of construction or repair to ensure that construction or repair is in accordance with the approved ventilation plan;

(4) Certify by initials, date, and time that the examinations were made; and

(5) Make a record of the examination at the completion of any shift during which an examination was conducted. The record shall include each deficiency and the corrective action taken. The record shall be countersigned by the mine foreman or equivalent mine official by the end of the mine foreman's or equivalent mine official's next regularly scheduled working shift. The record shall be kept at the mine for one year.

(d) Upon completion of construction of each seal a senior mine management official, such as a mine manager or superintendent, shall certify that the construction, installation, and materials used were in accordance with the approved ventilation plan. The mine operator shall retain the certification for as long as the seal is needed to serve the purpose for which it was built.

(e) The mine operator shall—

(1) Notify the District Manager between two and fourteen days prior to commencement of seal construction;

(2) Notify the District Manager, in writing, within five days of completion of a set of seals and provide a copy of the certification required in paragraph (d) of this section; and

(3) Submit a copy of quality control results to the District Manager for seal material properties specified by §75.335 within 30 days of completion of quality control tests.

(f) *Welding, cutting, and soldering.* Welding, cutting, and soldering with an arc or flame are prohibited within 150 feet of a seal. An operator may request a different location in the ventilation plan to be approved by the District Manager. The operator's request must address methods the mine operator will use to continuously monitor atmospheric conditions in the sealed area during welding or burning; the airflow conditions in and around the work area; the rock dust and water application methods; the availability of fire extinguishers on hand; the procedures to maintain safe conditions, and other relevant factors.

(g) *Sampling pipes.* (1) For seals constructed after April 18, 2008, one non-metallic sampling pipe shall be installed in each seal that shall extend into the center of the first connecting crosscut inby the seal. If an open crosscut does not exist, the sampling pipe shall extend one-half of the distance of the open entry inby the seal.

(2) Each sampling pipe shall be equipped with a shut-off valve and appropriate fittings for taking gas samples.

(3) The sampling pipes shall be labeled to indicate the location of the sampling point when more than one sampling pipe is installed through a seal.

(4) If a new seal is constructed to replace or reinforce an existing seal with a sampling pipe, the sampling pipe in the existing seal shall extend through the new seal. An additional sampling pipe shall be installed through each new seal to sample the area between seals, as specified in the approved ventilation plan.

(h) *Water drainage system.* For each set of seals constructed after April 18, 2008, the seal at the lowest elevation shall have a corrosion-resistant, non-metallic water drainage system. Seals shall not impound water or slurry. Water or slurry shall not accumulate within the sealed area to any depth that can adversely affect a seal.

[73 FR 21207, Apr. 18, 2008]

30 CFR §75.338

Training.

(a) Certified persons conducting sampling shall be trained in the use of appropriate sampling equipment, procedures, location of sampling points, frequency of sampling, size and condition of the sealed area, and the use of continuous monitoring systems if applicable before they conduct sampling, and annually thereafter. The mine operator shall certify the date of training provided to certified persons and retain each certification for two years.

(b) Miners constructing or repairing seals, designated certified persons, and senior mine management officials shall be trained prior to constructing or repairing a seal and annually thereafter. The training shall address materials and procedures in the approved seal design and ventilation plan. The mine operator shall certify the date of training provided each miner, certified person, and senior mine management official and retain each certification for two years.

[73 FR 21208, Apr. 18, 2008]

30 CFR §75.339

Seals records.

(a) The table entitled “Seal Recordkeeping Requirements” lists records the operator shall maintain and the retention period for each record.

TABLE—§75.339(a) SEAL RECORDKEEPING REQUIREMENTS

Record	Section reference	Retention time
(1) Approved seal design	75.335(c)(1)	As long as the seal is needed to serve the purpose for which it is built.
(2) Certification of Provisions of Approved Seal Design is Addressed	75.335(c)(2)	As long as the seal is needed to serve the purpose for which it is built.
(3) Gas sampling records	75.336(e)(2)	1 year.
(4) Record of examinations	75.337(c)(5)	1 year.
(5) Certification of seal construction, installation, and materials	75.337(d)	As long as the seal is needed to serve the purpose for which it is built.
(6) Certification of Training for Persons that Sample	75.338(a)	2 years.
(7) Certification of Training for Persons that Perform Seal Construction and Repair	75.338(b)	2 years.

(b) Records required by §§75.335, 75.336, 75.337 and 75.338 shall be retained at a surface location at the mine in a secure book that is not susceptible to alteration. The records may be retained electronically in a computer system that is secure and not susceptible to alteration, if the mine operator can immediately access the record from the mine site.

(c) Upon request from an authorized representative of the Secretary of Labor, the Secretary of Health and Human Services, or from the authorized representative of miners, mine operators shall promptly provide access to any record listed in the table in this section.

(d) Whenever an operator ceases to do business or transfers control of the mine to another entity, that operator shall transfer all records required to be maintained by this part, or a copy thereof, to any successor operator who shall maintain them for the required period.

[73 FR 21208, Apr. 18, 2008]

30 CFR §75.340 (added**)**

Underground electrical installations.

(a) Underground transformer stations, battery charging stations, substations, rectifiers, and water pumps shall be housed in noncombustible structures or areas or be equipped with a fire suppression system meeting the requirements of §75.1107-3 through §75.1107-16.

(1) When a noncombustible structure or area is used, these installations shall be--

(i) Ventilated with intake air that is coursed into a return air course or to the surface and that is not used to ventilate working places; or

(ii) Ventilated with intake air that is monitored for carbon monoxide or smoke by an AMS installed and operated according to §75.351. Monitoring of intake air

ventilating battery charging stations shall be done with sensors not affected by hydrogen; or

(iii) Ventilated with intake air and equipped with sensors to monitor for heat and for carbon monoxide or smoke. Monitoring of intake air ventilating battery charging stations shall be done with sensors not affected by hydrogen. The sensors shall de-energize power to the installation, activate a visual and audible alarm located outside of and on the intake side of the enclosure, and activate doors that will automatically close when either of the following occurs:

(A) The temperature in the noncombustible structure reaches 165°F; or

(B) The carbon monoxide concentration reaches 10 parts per million above the ambient level for the area, or the optical density of smoke reaches 0.022 per meter. At least every 31 days, sensors installed to monitor for carbon monoxide shall be calibrated with a known concentration of carbon monoxide and air sufficient to activate the closing door, or each smoke sensor shall be tested to determine that it functions correctly.

(2) When a fire suppression system is used, these installations shall be--

(i) Ventilated with intake air that is coursed into a return air course or to the surface and that is not used to ventilate working places; or

(ii) Ventilated with intake air that is monitored for carbon monoxide or smoke by an AMS installed and operated according to §75.351. Monitoring of intake air ventilating battery charging stations shall be done with sensors not affected by hydrogen.

(b) This section does not apply to--

(1) Rectifiers and power centers with transformers that are either dry-type or contain nonflammable liquid, if they are located at or near the section and are moved as the working section advances or retreats;

(2) Submersible pumps;

(3) Permissible pumps and associated permissible switchgear;

(4) Pumps located on or near the section and that are moved as the working section advances or retreats;

(5) Pumps installed in anthracite mines; and

(6) Small portable pumps.

30 CFR §75.341

Direct-fired intake air heaters.

(a) If any system used to heat intake air malfunctions, the heaters affected shall switch off automatically.

(b) Thermal overload devices shall protect the blower motor from overheating.

(c) The fuel supply shall turn off automatically if a flame-out occurs.

(d) Each heater shall be located or guarded to prevent contact by persons and shall be equipped with a screen at the inlet to prevent combustible materials from passing over the burner units.

(e) If intake air heaters use liquefied fuel systems--

(1) Hydrostatic relief valves installed on vaporizers and on storage tanks shall be vented; and

(2) Fuel storage tanks shall be located or protected to prevent fuel from leaking into the mine.

(f) Following any period of 8 hours or more during which a heater does not operate, the heater and its associated components shall be examined within its first hour of operation. Additionally, each heater and its components shall be examined at least once each shift that the heater operates. The examination shall include measurement of the carbon monoxide concentration at the bottom of each shaft, slope, or in the drift opening where air is being heated. The measurements shall be taken by a person designated by the operator or by a carbon monoxide sensor that is calibrated with a known concentration of carbon monoxide and air at least once every 31 days. When the carbon monoxide concentration at this location reaches 50 parts per million, the heater causing the elevated carbon monoxide level shall be shut down.

30 CFR §75.342

Methane monitors.

(a)(1) MSHA approved methane monitors shall be installed on all face cutting machines, continuous miners, longwall face equipment, loading machines, and other mechanized equipment used to extract or load coal within the working place.

(2) The sensing device for methane monitors on longwall shearing machines shall be installed at the return air end of the longwall face. An additional sensing device also shall be installed on the longwall shearing machine, downwind and as close to the cutting head as practicable. An alternative location or locations for the sensing device required on the longwall shearing machine may be approved in the ventilation plan.

(3) The sensing devices of methane monitors shall be installed as close to the working face as practicable.

(4) Methane monitors shall be maintained in permissible and proper operating condition and shall be calibrated with a known air-methane mixture at least once every 31 days. To assure that methane monitors are properly maintained and calibrated, the operator shall:

i) Use persons properly trained in the maintenance, calibration, and permissibility of methane monitors to calibrate and maintain the devices.

(ii) Maintain a record of all calibration tests of methane monitors. Records shall be maintained in a secure book that is not susceptible to alteration or electronically in a computer system so as to be secure and not susceptible to alteration.

(iii) Retain the record of calibration tests for 1 year from the date of the test. Records shall be retained at a surface location at the mine and made available for inspection by authorized representatives of the Secretary and the representative of miners.

(b)(1) When the methane concentration at any methane monitor reaches 1.0 percent the monitor shall give a warning signal.

(2) The warning signal device of the methane monitor shall be visible to a person who can de-energize electric equipment or shut down diesel-powered equipment on which the monitor is mounted.

(c) The methane monitor shall automatically de-energize electric equipment or shut down diesel-powered equipment on which it is mounted when--

(1) The methane concentration at any methane monitor reaches 2.0 percent; or

(2) The monitor is not operating properly.

[61 FR 9829, Mar.11, 1996, as amended at 61 FR 55527, Oct. 25, 1996]

30 CFR §75.343

Underground shops.

(a) Underground shops shall be equipped with an automatic fire suppression system meeting the requirements of §75.1107-3 through §75.1107-16, or be enclosed in a noncombustible structure or area.

(b) Underground shops shall be ventilated with intake air that is coursed directly into a return air course.

30 CFR §75.344

Compressors.

(a) Except compressors that are components of equipment such as locomotives and rock dusting machines and compressors of less than 5 horsepower, electrical compressors including those that may start automatically shall be:

(1) Continuously attended by a person designated by the operator who can see the compressor at all times during its operation. Any designated person attending the compressor shall be capable of activating the fire suppression system and de-energizing or shutting-off the compressor in the event of a fire; or,

(2) Enclosed in a noncombustible structure or area which is ventilated by intake air coursed directly into a return air course or to the surface and equipped with sensors to monitor for heat and for carbon monoxide or smoke. The sensors shall de-energize power to the compressor, activate a visual and audible alarm located outside of and on the intake side of the enclosure, and activate doors to automatically enclose the noncombustible structure or area when either of the following occurs:

(i) The temperature in the noncombustible structure or area reaches 165°F.

(ii) The carbon monoxide concentration reaches 10 parts per million above the ambient level for the area, or the optical density of smoke reaches 0.022 per meter. At least once every 31 days, sensors installed to monitor for carbon monoxide shall be calibrated with a known concentration of carbon monoxide and air sufficient to activate the closing door, and each smoke sensor shall be tested to determine that it functions correctly.

(b) Compressors, except those exempted in paragraph (a), shall be equipped with a heat activated fire suppression system meeting the requirements of 75.1107-3 through 75.1107-16.

(c) Two portable fire extinguishers or one extinguisher having at least twice the minimum capacity specified for a portable fire extinguisher in §75.1100-1(e) shall be provided for each compressor.

(d) Notwithstanding the requirements of §75.1107-4, upon activation of any fire suppression system used under paragraph (b) of this section, the compressor shall be automatically de-energized or automatically shut off.

30 CFR §75.350

Air courses and belt haulage entries.

(a) The belt air course must not be used as a return air course; and except as provided in paragraph (b) of this section, the belt air course must not be used to provide air to working sections or to areas where mechanized mining equipment is being installed or removed.

(1) The belt air course must be separated with permanent ventilation controls from return air courses and from other intake air courses except as provided in paragraph (c) of this section.

(2) Effective December 31, 2009, the air velocity in the belt entry must be at least 50 feet per minute. When requested by the mine operator, the district manager may approve lower velocities in the ventilation plan based on specific mine conditions. Air velocities must be compatible with all fire detection systems and fire suppression systems used in the belt entry.

(b) The use of air from a belt air course to ventilate a working section, or an area where mechanized mining equipment is being installed or removed, shall be permitted only when evaluated and approved by the district manager in the mine ventilation plan. The mine operator must provide justification in the plan that the use of air from a belt entry would afford at least the same measure of protection as where belt haulage entries are not used to ventilate working places. In addition, the following requirements must be met:

(1) The belt entry must be equipped with an AMS that is installed, operated, examined, and maintained as specified in §75.351.

(2) All miners must be trained annually in the basic operating principles of the AMS, including the actions required in the event of activation of any AMS alert or alarm signal. This training must be conducted prior to working underground in a mine that uses belt air to ventilate working sections or areas where mechanized mining equipment is installed or removed. It must be conducted as part of a miner's 30 CFR part 48 new miner training (§48.5), experienced miner training (§48.6), or annual refresher training (§48.8).

(3)(i) The average concentration of respirable dust in the belt air course, when used as a section intake air course, shall be maintained at or below:

(A) 1.0 mg/m3.

(B) 0.5 mg/m3 as of August 1, 2016.

(ii) Where miners on the working section are on a reduced standard below that specified in §75.350(b)(3)(i), the average concentration of respirable dust in the belt entry must be at or below the lowest applicable standard on that section.

(iii) A permanent designated area (DA) for dust measurements must be established at a point no greater than 50 feet upwind from the section loading point in the belt entry when the belt air flows over the loading point or no greater than 50 feet upwind from the point where belt air is mixed with air from another intake air course near the loading point. The DA must be specified and approved in the ventilation plan.

(4) The primary escapeway must be monitored for carbon monoxide or smoke as specified in §75.351(f).

(5) The area of the mine with a belt air course must be developed with three or more entries.

(6) In areas of the mine developed after the effective date of this rule, unless approved by the district manager, no more than 50% of the total intake air, delivered to the working section or to areas where mechanized mining equipment is being installed or removed, can be supplied from the belt air course. The locations for measuring these air quantities must be approved in the mine ventilation plan.

(7) The air velocity in the belt entry must be at least 100 feet per minute. When requested by the mine operator, the district manager may approve lower velocities in the ventilation plan based on specific mine conditions.

(8) The air velocity in the belt entry must not exceed 1,000 feet per minute. When requested by the mine operator, the district manager may approve higher velocities in the ventilation plan based on specific mine conditions.

(c) Notwithstanding the provisions of §75.380(g), additional intake air may be added to the belt air course through a point-feed regulator. The location and use of point feeds must be approved in the mine ventilation plan.

(d) If the air through the point-feed regulator enters a belt air course which is used to ventilate a working section or an area where mechanized mining equipment is being installed or removed, the following conditions must be met:

(1) The air current that will pass through the point-feed regulator must be monitored for carbon monoxide or smoke at a point within 50 feet upwind of the point-feed regulator. A second point must be monitored 1,000 feet upwind of the point-feed regulator unless the mine operator requests that a lesser distance be approved by the district manager in the mine ventilation plan based on mine specific conditions;

(2) The air in the belt air course must be monitored for carbon monoxide or smoke upwind of the point-feed regulator. This sensor must be in the belt air course within 50 feet of the mixing point where air flowing through the point-feed regulator mixes with the belt air;

(3) The point-feed regulator must be provided with a means to close the regulator from the intake air course without requiring a person to enter the crosscut where the point-feed regulator is located. The point-feed regulator must also be provided with a means to close the regulator from a location in the belt air course immediately upwind of the crosscut containing the point-feed regulator;

(4) A minimum air velocity of 300 feet per minute must be maintained through the point-feed regulator;

(5) The location(s) and use of a point-feed regulator(s) must be approved in the mine ventilation plan and shown on the mine ventilation map; and

(6) An AMS must be installed, operated, examined, and maintained as specified in

§75.351.

[69 FR 17526, Apr. 2, 2004, as amended at 70 FR 37266, June 29, 2005; 71 FR 12269, Mar. 9, 2006; 73 FR 80612, Dec. 31, 2008; 79 FR 24987, May 1, 2014]

30 CFR §75.351

Atmospheric monitoring system (AMS).

(a) AMS operation. Whenever personnel are underground and an AMS is used to fulfill the requirements of §§75.323(d)(1)(ii), 75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), 75.350(d), or 75.362(f), the AMS must be operating and a designated AMS operator must be on duty at a location on the surface of the mine where audible and visual signals from the AMS must be seen or heard and the AMS operator can promptly respond to these signals.

(b) Designated surface location and AMS operator. When an AMS is used to comply with §§75.323(d)(1)(ii), 75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), 75.350(d), or 75.362(f), the following requirements apply:

(1) The mine operator must designate a surface location at the mine where signals from the AMS will be received and two-way voice communication is maintained with each working section, with areas where mechanized mining equipment is being installed or removed, and with other areas designated in the approved emergency evacuation and firefighting program of instruction (§75.1502).

(2) The mine operator must designate an AMS operator to monitor and promptly respond to all AMS signals. The AMS operator must have as a primary duty the responsibility to monitor the malfunction, alert and alarm signals of the AMS, and to notify appropriate personnel of these signals. In the event of an emergency, the sole responsibility of the AMS operator shall be to respond to the emergency.

(3) A map or schematic must be provided at the designated surface location that shows the locations and type of AMS sensor at each location, and the intended air flow direction at these locations. This map or schematic must be updated within 24 hours of any change in this information.

(4) The names of the designated AMS operators and other appropriate personnel, including the designated person responsible for initiating an emergency mine evacuation under §75.1501, and the method to contact these persons, must be provided at the designated surface location.

(c) *Minimum operating requirements.* AMSs used to comply with §§75.323(d)(1)(ii), 75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), 75.350(d), or 75.362(f) must:

(1) Automatically provide visual and audible signals at the designated surface location for any interruption of circuit continuity and any electrical malfunction of the system. These signals must be of sufficient magnitude to be seen or heard by the AMS operator.

(2) Automatically provide visual and audible signals at the designated surface location when the carbon monoxide concentration or methane concentration at any sensor reaches the alert level as specified in §75.351(i). These signals must be of sufficient magnitude to be seen or heard by the AMS operator.

(3) Automatically provide visual and audible signals at the designated surface location distinguishable from alert signals when the carbon monoxide, smoke, or methane concentration at any sensor reaches the alarm level as specified in §75.351(i). These signals must be of sufficient magnitude to be seen or heard by the AMS operator.

(4) Automatically provide visual and audible signals at all affected working sections and at all affected areas where mechanized mining equipment is being installed or removed when the carbon monoxide, smoke, or methane concentration at any sensor reaches the alarm level as specified in §75.351(i). These signals must be of sufficient magnitude to be seen or heard by miners working at these locations. Methane signals must be distinguishable from other signals.

(5) Automatically provide visual and audible signals at other locations as specified in Mine Emergency Evacuation and Firefighting Program of Instruction (§75.1502) when the carbon monoxide, smoke, or methane concentration at any sensor reaches the alarm level as specified in §75.351(i). These signals must be seen or heard by miners working at these locations. Methane alarms must be distinguishable from other signals.

(6) Identify at the designated surface location the operational status of all sensors.

(7) Automatically provide visual and audible alarm signals at the designated surface location, at all affected working sections, and at all affected areas where mechanized mining equipment is being installed or removed when the carbon monoxide level at any two consecutive sensors alert at the same time. These signals must be seen or heard by the AMS operator and miners working at these locations.

(d) *Location and installation of AMS sensors*. (1) All AMS sensors, as specified in §§75.351(e) through 75.351(h), must be located such that measurements are representative of the mine atmosphere in these locations.

(2) Carbon monoxide or smoke sensors must be installed near the center in the upper third of the entry, in a location that does not expose personnel working on the system to unsafe conditions. Sensors must not be located in abnormally high areas or in other locations where air flow patterns do not permit products of combustion to be carried to the sensors.

(3) Methane sensors must be installed near the center of the entry, at least 12 inches from the roof, ribs, and floor, in a location that would not expose personnel working on the system to unsafe conditions.

(e) *Location of sensors-belt air course. (*1) In addition to the requirements of paragraph (d) of this section, any AMS used to monitor belt air courses under §75.350(b) must have approved sensors to monitor for carbon monoxide at the following locations:

(i) At or near the working section belt tailpiece in the air stream ventilating the belt entry. In longwall mining systems the sensor must be located upwind in the belt entry at a distance no greater than 150 feet from the mixing point where intake air is mixed with the belt air at or near the tailpiece;

(ii) No more than 50 feet upwind from the point where the belt air course is combined with another air course or splits into multiple air courses;

(iii) At intervals not to exceed 1,000 feet along each belt entry. However, in areas along each belt entry where air velocities are between 50 and 100 feet per minute, spacing of sensors must not exceed 500 feet. In areas along each belt entry where air velocities are less than 50 feet per minute, the sensor spacing must not exceed 350 feet;

(iv) Not more than 100 feet downwind of each belt drive unit, each tailpiece, transfer point, and each belt take-up. If the belt drive, tailpiece, and/or take-up for a single transfer point are installed together in the same air course, and the distance between the units is less than 100 feet, they may be monitored with one sensor downwind of the last component. If the distance between the units exceeds 100 feet, additional sensors are required downwind of each belt drive unit, each tailpiece, transfer point, and each belt take-up; and

(v) At other locations in any entry that is part of the belt air course as required and specified in the mine ventilation plan.

(2) Smoke sensors must be installed to monitor the belt entry under §75.350(b) at the following locations:

(i) At or near the working section belt tailpiece in the air stream ventilating the belt entry. In longwall mining systems the sensor must be located upwind in the belt entry at a distance no greater than 150 feet from the mixing point where intake air is mixed with the belt air at or near the tailpiece;

(ii) Not more than 100 feet downwind of each belt drive unit, each tailpiece transfer point, and each belt take-up. If the belt drive, tailpiece, and/or take-up for a single transfer point are installed together in the same air course, and the distance between the units is less than 100 feet, they may be monitored with one sensor downwind of the last component. If the distance between the units exceeds 100 feet, additional sensors are required downwind of each belt drive unit, each tailpiece, transfer point, and each belt take-up; and

(iii) At intervals not to exceed 3,000 feet along each belt entry.

(iv) This provision shall be effective one year after the Secretary has determined that a smoke sensor is available to reliably detect fire in underground coal mines.

(f) *Locations of sensors—the primary escapeway.* When used to monitor the primary escapeway under §75.350(b)(4), carbon monoxide or smoke sensors must be located in the

primary escapeway within 500 feet of the working section and areas where mechanized mining equipment is being installed or removed. In addition, another sensor must be located within 500 feet inby the beginning of the panel. The point-feed sensor required by §75.350(d)(1) may be used as the sensor at the beginning of the panel if it is located within 500 feet inby the beginning of the panel.

(g) *Location of sensors—return air splits.* (1) If used to monitor return air splits under §75.362(f), a methane sensor must be installed in the return air split between the last working place, longwall or shortwall face ventilated by that air split, and the junction of the return air split with another air split, sealed or worked out area.

(2) If used to monitor a return air split under §75.323(d)(1)(ii), the methane sensors must be installed at the following locations:

(i) In the return air course opposite the section loading point, or, if exhausting auxiliary fan(s) are used, in the return air course no closer than 300 feet downwind from the fan exhaust and at a point opposite or immediately outby the section loading point; and

(ii) Immediately upwind from the location where the return air split meets another air split or immediately upwind of the location where an air split is used to ventilate seals or worked-out areas.

(h) *Location of sensors—electrical installations.* When monitoring the intake air ventilating underground transformer stations, battery charging stations, substations, rectifiers, or water pumps under §75.340(a)(1)(ii) or §75.340(a)(2)(ii), at least one sensor must be installed to monitor the mine atmosphere for carbon monoxide or smoke, located downwind and not greater than 50 feet from the electrical installation being monitored.

(i) *Establishing alert and alarm levels.* An AMS installed in accordance with the following paragraphs must initiate alert and alarm signals at the specified levels, as indicated:

(1) For §75.323(d)(1)(ii) alarm at 1.5% methane.

(2) For §§75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), and 75.350(d), alert at 5 ppm carbon monoxide above the ambient level and alarm at 10 ppm carbon monoxide above the ambient level when carbon monoxide sensors are used; and alarm at a smoke optical density of 0.022 per meter when smoke sensors are used. Reduced alert and alarm settings approved by the district manager may be required for carbon monoxide sensors identified in the mine ventilation plan, §75.371(nn).

(3) For §75.362(f), alert at 1.0% methane and alarm at 1.5% methane.

(j) *Establishing carbon monoxide ambient levels.* Carbon monoxide ambient levels and the means to determine these levels must be approved in the mine ventilation plan (§75.371(hh)) for monitors installed in accordance with §§75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), and 75.350(d).

(k) *Installation and maintenance.* An AMS installed in accordance with §§75.323(d)(1)(ii),

75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), 75.350(d), or 75.362(f) must be installed and maintained by personnel trained in the installation and maintenance of the system. The system must be maintained in proper operating condition.

(l) *Sensors.* Sensors used to monitor for carbon monoxide, methane, and smoke must be either of a type listed and installed in accordance with the recommendations of a nationally recognized testing laboratory approved by the Secretary; or these sensors must be of a type, and installed in a manner, approved by the Secretary.

(m) *Time delays.* When a demonstrated need exists, time delays may be incorporated into the AMS. These time delays must only be used to account for non-fire related carbon monoxide alert and alarm sensor signals. These time delays are limited to no more than three minutes. The use and length of any time delays, or other techniques or methods which eliminate or reduce the need for time delays, must be specified and approved in the mine ventilation plan.

(n) *Examination, testing, and calibration.* (1) At least once each shift when belts are operated as part of a production shift, sensors used to detect carbon monoxide or smoke in accordance with §§75.350(b), and 75.350(d), and alarms installed in accordance with §75.350(b) must be visually examined.

(2) At least once every seven days, alarms for AMS installed in accordance with §§75.350(b), and 75.350(d) must be functionally tested for proper operation.

(3) At intervals not to exceed 31 days—

(i) Each carbon monoxide sensor installed in accordance with §§75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), or 75.350(d) must be calibrated in accordance with the manufacturer's calibration specifications. Calibration must be done with a known concentration of carbon monoxide in air sufficient to activate the alarm;

(ii) Each smoke sensor installed in accordance with §§75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), or 75.350(d) must be functionally tested in accordance with the manufacturer's calibration specifications;

(iii) Each methane sensor installed in accordance with §§75.323(d)(1)(ii) or 75.362(f) must be calibrated in accordance with the manufacturer's calibration specifications. Calibration must be done with a known concentration of methane in air sufficient to activate an alarm.

(iv) If the alert or alarm signals will be activated during calibration of sensors, the AMS operator must be notified prior to and upon completion of calibration. The AMS operator must notify miners on affected working sections, areas where mechanized mining equipment is being installed or removed, or other areas designated in the approved emergency evacuation and firefighting program of instruction (§75.1502) when calibration will activate alarms and when calibration is completed.

(4) Gases used for the testing and calibration of AMS sensors must be traceable to the

National Institute of Standards and Technology reference standard for the specific gas. When these reference standards are not available for a specific gas, calibration gases must be traceable to an analytical standard which is prepared using a method traceable to the National Institute of Standards and Technology. Calibration gases must be within ±2.0 percent of the indicated gas concentration.

(o) *Recordkeeping.* (1) When an AMS is used to comply with §§75.323(d)(1)(ii), 75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), 75.350(d), or 75.362(f), individuals designated by the operator must make the following records by the end of the shift in which the following event(s) occur:

(i) If an alert or alarm signal occurs, a record of the date, time, location and type of sensor, and the cause for the activation.

(ii) If an AMS malfunctions, a record of the date, the extent and cause of the malfunction, and the corrective action taken to return the system to proper operation.

(iii) A record of the seven-day tests of alert and alarm signals; calibrations; and maintenance of the AMS must be made by the person(s) performing these actions.

(2) The person entering the record must include their name, date, and signature in the record.

(3) The records required by this section must be kept either in a secure book that is not susceptible to alteration, or electronically in a computer system that is secure and not susceptible to alteration. These records must be maintained separately from other records and identifiable by a title, such as the 'AMS log.'

(p) *Retention period.* Records must be retained for at least one year at a surface location at the mine and made available for inspection by miners and authorized representatives of the Secretary.

(q) *Training.* (1) All AMS operators must be trained annually in the proper operation of the AMS. This training must include the following subjects:

(i) Familiarity with underground mining systems;

(ii) Basic atmospheric monitoring system requirements;

(iii) The mine emergency evacuation and firefighting program of instruction;

(iv) The mine ventilation system including planned air directions;

(v) Appropriate response to alert, alarm and malfunction signals;

(vi) Use of mine communication systems including emergency notification procedures; and

(vii) AMS recordkeeping requirements.

(2) At least once every six months, all AMS operators must travel to all working sections.

(3) A record of the content of training, the person conducting the training, and the date the training was conducted, must be maintained at the mine for at least one year by the mine operator.

(r) *Communications.* When an AMS is used to comply with §75.350(b), a two-way voice communication system required by §75.1600 must be installed in an entry that is separate from the entry in which the AMS is installed no later than August 2, 2004. The two-way voice communication system may be installed in the entry where the intake sensors required by §§75.350(b)(4) or 75.350(d)(1) are installed.

[69 FR 17527, Apr. 2, 2004, as amended at 73 FR 80612, Dec. 31, 2008]

30 CFR §75.352

Actions in response to AMS malfunction, alert, or alarm signals.

(a) When a malfunction, alert, or alarm signal is received at the designated surface location, the sensor(s) that are activated must be identified and the AMS operator must promptly notify appropriate personnel.

(b) Upon notification of a malfunction, alert, or alarm signal, appropriate personnel must promptly initiate an investigation to determine the cause of the signal and take the required actions set forth in paragraphs (c), (d), or (e) of this section.

(c) If any sensor installed in accordance with §§75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), or 75.350(d) indicates an alarm or if any two consecutive sensors indicate alert at the same time, the following procedures must be followed unless the cause of the signal(s) is known not to be a hazard to miners:

(1) Appropriate personnel must notify miners in affected working sections, in affected areas where mechanized mining equipment is being installed or removed, and at other locations specified in the §75.1502 approved mine emergency evacuation and firefighting program of instruction; and

(2) All personnel in the affected areas, unless assigned other duties under §75.1502, must be withdrawn promptly to a safe location identified in the mine emergency evacuation and firefighting program of instruction.

(d) If there is an alert or alarm signal from a methane sensor installed in accordance with §§75.323(d)(1)(ii) and 75.362(f), an investigation must be initiated to determine the cause of the signal, and the actions required under §75.323 must be taken.

(e) If any fire detection components of the AMS malfunction or are inoperative, immediate action must be taken to return the system to proper operation. While the AMS component

repairs are being made, operation of the belt may continue if the following conditions are met:

(1) If one AMS sensor malfunctions or becomes inoperative, a trained person must continuously monitor for carbon monoxide or smoke at the inoperative sensor.

(2) If two or more adjacent AMS sensors malfunction or become inoperative, a trained person(s) must patrol and continuously monitor for carbon monoxide or smoke so that the affected areas will be traveled each hour in their entirety, or a trained person must be stationed to monitor at each inoperative sensor.

(3) If the complete AMS malfunctions or becomes inoperative, trained persons must patrol and continuously monitor for carbon monoxide or smoke so that the affected areas will be traveled each hour in their entirety.

(4) The trained person(s) monitoring under this section must, at a minimum, have two-way voice communication capabilities with the AMS operator at intervals not to exceed 2,000 feet and report contaminant levels to the AMS operator at intervals not to exceed 60 minutes.

(5) The trained person(s) monitoring under this section must report immediately to the AMS operator any concentration of the contaminant that reaches either the alert or alarm level specified in §75.351(i), or the alternate alert and alarm levels specified in paragraph (e)(7) of this section, unless the source of the contaminant is known not to present a hazard.

(6) Detectors used to monitor under this section must have a level of detectability equal to that required of the sensors in §75.351(l).

(7) For those AMSs using sensors other than carbon monoxide sensors, an alternate detector and the alert and alarm levels associated with that detector must be specified in the approved mine ventilation plan.

(f) If the minimum air velocity is not maintained when required under §75.350(b)(7), immediate action must be taken to return the ventilation system to proper operation. While the ventilation system is being corrected, operation of the belt may continue only while a trained person(s) patrols and continuously monitors for carbon monoxide or smoke as set forth in §§75.352(e)(3) through (7), so that the affected areas will be traveled each hour in their entirety.

(g) The AMS shall automatically provide both a visual and audible signal in the belt entry at the point-feed regulator location, at affected sections, and at the designated surface location when carbon monoxide concentrations reach:

(1) The alert level at both point-feed intake monitoring sensors; or

(2) The alarm level at either point-feed intake monitoring sensor.

[69 FR 17529, Apr. 2, 2004, as amended at 73 FR 80613, Dec. 31, 2008]

30 CFR §75.360

Pre-shift examination at fixed intervals.

(a)(1) Except as provided in paragraph (a)(2) of this section, a certified person designated by the operator must make a Pre-shift examination within 3 hours preceding the beginning of any 8-hour interval during which any person is scheduled to work or travel underground. No person other than certified examiners may enter or remain in any underground area unless a Pre-shift examination has been completed for the established 8-hour interval. The operator must establish 8-hour intervals of time subject to the required Pre-shift examinations.

(2) Pre-shift examinations of areas where pumpers are scheduled to work or travel shall not be required prior to the pumper entering the areas if the pumper is a certified person and the pumper conducts an examination for hazardous conditions and violations of the Mandatory Safety and Health standards referenced in paragraph (b)(11) of this section, tests for methane and oxygen deficiency, and determines if the air is moving in its proper direction in the area where the pumper works or travels. The examination of the area must be completed before the pumper performs any other work. A record of all hazardous conditions and violations of the Mandatory Safety and Health standards found by the pumper shall be made and retained in accordance with §75.363 of this part.

(b) The person conducting the Pre-shift examination shall examine for hazardous conditions and violations of the Mandatory Safety and Health standards referenced in paragraph (b)(11) of this section, test for methane and oxygen deficiency, and determine if the air is moving in its proper direction at the following locations:

(1) Roadways, travelways and track haulageways where persons are scheduled, prior to the beginning of the Pre-shift examination, to work or travel during the oncoming shift.

(2) Belt conveyors that will be used to transport persons during the oncoming shift and the entries in which these belt conveyors are located.

(3) Working sections and areas where mechanized mining equipment is being installed or removed, if anyone is scheduled to work on the section or in the area during the oncoming shift. The scope of the examination shall include the working places, approaches to worked-out areas and ventilation controls on these sections and in these areas, and the examination shall include tests of the roof, face and rib conditions on these sections and in these areas.

(4) Approaches to worked-out areas along intake air courses and at the entries used to carry air into worked-out areas if the intake air passing the approaches is used to ventilate working sections where anyone is scheduled to work during the oncoming shift. The examination of the approaches to the worked-out areas shall be made in the intake air course immediately inby and outby each entry used to carry air into the worked-out area. An examination of the entries used to carry air into the worked-out areas shall be conducted at a point immediately inby the intersection of each entry with the intake air course.

(5) Seals along intake air courses where intake air passes by a seal to ventilate working sections where anyone is scheduled to work during the oncoming shift.

(6)(i) Entries and rooms developed after November 15, 1992, and developed more than 2 crosscuts off an intake air course without permanent ventilation controls where intake air passes through or by these entries or rooms to reach a working section where anyone is scheduled to work during the oncoming shift; and,

(ii) Entries and rooms developed after November 15, 1992, and driven more than 20 feet off an intake air course without a crosscut and without permanent ventilation controls where intake air passes through or by these entries or rooms to reach a working section where anyone is scheduled to work during the oncoming shift.

(7) Areas where trolley wires or trolley feeder wires are to be or will remain energized during the oncoming shift.

(8) High spots along intake air courses where methane is likely to accumulate, if equipment will be operated in the area during the shift.

(9) Underground electrical installations referred to in §75.340(a), except those pumps listed in §75.340 (b)(2) through (b)(6), and areas where compressors subject to §75.344 are installed if the electrical installation or compressor is or will be energized during the shift.

(10) Other areas where work or travel during the oncoming shift is scheduled prior to the beginning of the Pre-shift examination.

(11) Pre-shift examinations shall include examinations to identify violations of the standards listed below:

(i) §§75.202(a) and 75.220(a)(1) - Protection from falls of roof, face and ribs; roof control;

(ii) §§75.333(h) and 75.370(a)(1) – Ventilation controls; ventilation plan-control of methane and respirable dust;

(iii) §§75.400 and 75.403 - Accumulations of combustible materials and application of rock dust;

(iv) §75.1403 - Other safeguards, limited to maintenance of travelways along belt conveyors, off track haulage roadways, and track haulage, track switches, and other components for haulage;

(v) §75.1722(a) - Guarding moving machine parts; and

(vi) §75.1731(a) - Maintenance of belt conveyor components.

(c) The person conducting the Pre-shift examination shall determine the volume of air entering each of the following areas if anyone is scheduled to work in the areas during the oncoming shift:

(1) In the last open crosscut of each set of entries or rooms on each working section and areas where mechanized mining equipment is being installed or removed. The last open crosscut is the crosscut in the line of pillars containing the permanent stoppings that separate the intake air courses and the return air courses.

(2) On each longwall or shortwall in the intake entry or entries at the intake end of the longwall or shortwall face immediately outby the face and the velocity of air at each end of the face at the locations specified in the approved ventilation plan.

(3) At the intake end of any pillar line -

(i) If a single split of air is used, in the intake entry furthest from the return air course, immediately outby the first open crosscut outby the line of pillars being mined; or

(ii) If a split system is used, in the intake entries of each split immediately inby the split point.

(d) The person conducting the Pre-shift examination shall check the refuge alternative for damage, the integrity of the tamper-evident seal and the mechanisms required to deploy the refuge alternative, and the ready availability of compressed oxygen and air.

(e) The district manager may require the operator to examine other areas of the mine or examine for other hazards and violations of other Mandatory Safety and Health standards found during the Pre-shift examination.

(f) *Certification.* At each working place examined, the person doing the Pre-shift examination shall certify by initials, date, and the time, that the examination was made. In areas required to be examined outby a working section, the certified person shall certify by initials, date, and the time at enough locations to show that the entire area has been examined.

(g) *Recordkeeping.* A record of the results of each Pre-shift examination, including a record of hazardous conditions and violations of the nine Mandatory Health and Safety standards and their locations found by the examiner during each examination, and of the results and locations of air and methane measurements, shall be made on the surface before any persons, other than certified persons conducting examinations required by this subpart, enter any underground area of the mine. The results of methane tests shall be recorded as the percentage of methane measured by the examiner. The record shall be made by the certified person who made the examination or by a person designated by the operator. If the record is made by someone other than the examiner, the examiner shall verify the record by initials and date by or at the end of the shift for which the examination was made. A record shall also be made by a certified person of the action taken to correct hazardous conditions and violations of Mandatory Health and Safety standards found during the Pre-shift examination. All Pre-shift and corrective action records shall be countersigned by the mine foreman or equivalent mine official by the end of the mine foreman's or equivalent mine official's next regularly scheduled working shift. The records required by this section shall be made in a secure book that is not susceptible to alteration or electronically in a computer system so as to be secure and not susceptible to alteration.

(h) *Retention period*. Records shall be retained at a surface location at the mine for at least 1 year and shall be made available for inspection by authorized representatives of the Secretary and the representative of miners.

[61 FR 9829, Mar. 11, 1996, as amended at 61 FR 55527, Oct. 25, 1996; 62 FR 35085, June 30, 1997; 64 FR 45170, Aug. 19, 1999; 73 FR 80697, Dec. 31, 2008; 77 FR 20714, Apr. 6, 2012]

30 CFR §75.361

Supplemental examination.

(a)(1) Except for certified persons conducting examinations required by this subpart, within 3 hours before anyone enters an area in which a Pre-shift examination has not been made for that shift, a certified person shall examine the area for hazardous conditions and violations of the Mandatory Health and Safety standards referenced in paragraph (a)(2) of this section, determine whether the air is traveling in its proper direction and at its normal volume, and test for methane and oxygen deficiency.

(2) Supplemental examinations shall include examinations to identify violations of the standards listed below:

(i) §§75.202(a) and 75.220(a)(1) - Protection from falls of roof, face and ribs; roof control;

(ii) §§75.333(h) and 75.370(a)(1) – Ventilation controls; ventilation plan-control of methane and respirable dust;

(iii) §§75.400 and 75.403 - Accumulations of combustible materials and application of rock dust;

(iv) §75.1403 - Other safeguards, limited to maintenance of travelways along belt conveyors, off track haulage roadways, and track haulage, track switches, and other components for haulage;

(v) §75.1722(a) - Guarding moving machine parts; and

(vi) §75.1731(a) - Maintenance of belt conveyor components..

(b) *Certification.* At each working place examined, the person making the supplemental examination shall certify by initials, date, and the time, that the examination was made. In areas required to be examined outby a working section, the certified person shall certify by initials, date, and the time at enough locations to show that the entire area has been examined.

[61 FR 9829, Mar. 11, 1996, as amended at 77 FR 20714, 2012]

30 CFR §75.362

On-shift examination.

(a)(1) At least once during each shift, or more often if necessary for safety, a certified person designated by the operator shall conduct an On-shift examination of each section where anyone is assigned to work during the shift and any area where mechanized mining equipment is being installed or removed during the shift. The certified person shall check for hazardous conditions and violations of the Mandatory Health and Safety standards referenced in paragraph (a)(3) of this section, test for methane and oxygen deficiency, and determine if the air is moving in its proper direction.

(2) A person designated by the operator shall conduct an examination and record the results and the corrective actions taken to assure compliance with the respirable dust control parameters specified in the approved mine ventilation plan. In those instances when a shift change is accomplished without an interruption in production on a section, the examination shall be made anytime within 1 hour after the shift change. In those instances when there is an interruption in production during the shift change, the examination shall be made before production begins on a section. Deficiencies in dust controls shall be corrected before production begins or resumes. The examination shall include: Air quantities and velocities; water pressures and flow rates; excessive leakage in the water delivery system; water spray numbers and orientations; section ventilation and control device placement; roof bolting machine dust collector vacuum levels; scrubber air flow rate; work practices required by the ventilation plan; and any other dust suppression measures. Measurements of the air velocity and quantity, water pressure and flow rates are not required if continuous monitoring of these controls is used and indicates that the dust controls are functioning properly.

(3) On-shift examinations shall include examinations to identify violations of the standards listed below:

(i) §§75.202(a) and 75.220(a)(1) - Protection from falls of roof, face and ribs; roof control;

(ii) §§75.333(h) and 75.370(a)(1) – Ventilation controls; ventilation plan-control of methane and respirable dust;

(iii) §§75.400 and 75.403 - Accumulations of combustible materials and application of rock dust;

(iv) §75.1403 - Other safeguards, limited to maintenance of travelways along belt conveyors, off track haulage roadways, and track haulage, track switches, and other components for haulage;

(v) §75.1722(a) - Guarding moving machine parts; and

(vi) §75.1731(a) - Maintenance of belt conveyor components.

(b) During each shift that coal is produced, a certified person shall examine for hazardous conditions and violations of the Mandatory Health and Safety standards referenced in paragraph (a)(3) of this section along each belt conveyor haulageway where a belt conveyor is operated. This examination may be conducted at the same time as the Pre-shift examination of belt conveyors and belt conveyor haulageways, if the examination is conducted within 3 hours before the oncoming shift.

(c) Persons conducting the On-shift examination shall determine at the following locations:

(1) The volume of air in the last open crosscut of each set of entries or rooms on each section and areas where mechanized mining equipment is being installed or removed. The last open crosscut is the crosscut in the line of pillars containing the permanent stoppings that separate the intake air courses and the return air courses.

(2) The volume of air on a longwall or shortwall, including areas where longwall or shortwall equipment is being installed or removed, in the intake entry or entries at the intake end of the longwall or shortwall.

(3) The velocity of air at each end of the longwall or shortwall face at the locations specified in the approved ventilation plan.

(4) The volume of air at the intake end of any pillar line -

(i) Where a single split of air is used in the intake entry furthest from the return air course immediately outby the first open crosscut outby the line of pillars being mined; or

(ii) Where a split system is used in the intake entries of each split immediately inby the split point.

(d) (1) A qualified person shall make tests for methane -

(i) At the start of each shift at each working place before electrically operated equipment is energized; and

(ii) Immediately before equipment is energized, taken into, or operated in a working place; and

(iii) At 20-minute intervals, or more often if required in the approved ventilation plan at specific locations, during the operation of equipment in the working place.

(2) Except as provided for in paragraph (d)(3) of this section, these methane tests shall be made at the face from under permanent roof support, using extendable probes or other acceptable means. When longwall or shortwall mining systems are used, these methane tests shall be made at the shearer, the plow, or the cutting head. When mining has been stopped for more than 20 minutes, methane tests shall be conducted prior to the start up of equipment.

(3) As an alternative method of compliance with paragraph (d)(2) of this section during roof bolting, methane tests may be made by sweeping an area not less than 16 feet inby the last area of permanently supported roof, using a probe or other acceptable means. This method of testing is conditioned on meeting the following requirements:

(i) The roof bolting machine must be equipped with an integral automated temporary roof support (ATRS) system that meets the requirements of 30 CFR §75.209.

(ii) The roof bolting machine must have a permanently mounted, MSHA-approved methane monitor which meets the maintenance and calibration requirements of 30 CFR §75.342(a)(4), the warning signal requirements of 30 CFR §75.342(b), and the automatic de-energization requirements of 30 CFR §75.342(c).

(iii) The methane monitor sensor must be mounted near the inby end and within 18 inches of the longitudinal center of the ATRS support, and positioned at least 12 inches from the roof when the ATRS is fully deployed.

(iv) Manual methane tests must be made at intervals not exceeding 20 minutes. The test may be made either from under permanent roof support or from the roof bolter's work position protected by the deployed ATRS.

(v) Once a methane test is made at the face, all subsequent methane tests in the same area of unsupported roof must also be made at the face, from under permanent roof support, using extendable probes or other acceptable means at intervals not exceeding 20 minutes.

(vi) The district manager may require that the ventilation plan include the minimum air quantity and the position and placement of ventilation controls to be maintained during roof bolting.

(e) If auxiliary fans and tubing are used, they shall be inspected frequently.

(f) During each shift that coal is produced and at intervals not exceeding 4 hours, tests for methane shall be made by a certified person or by an atmospheric monitoring system (AMS) in each return split of air from each working section between the last working place, or longwall or shortwall face, ventilated by that split of air and the junction of the return air split with another air split, seal, or worked-out area. If auxiliary fans and tubing are used, the tests shall be made at a location outby the auxiliary fan discharge.

(g) *Certification.* (1) The person conducting the On-shift examination in belt haulage entries shall certify by initials, date, and time that the examination was made. The certified person shall certify by initials, date, and the time at enough locations to show that the entire area has been examined.

(2) The certified person directing the On-shift examination to assure compliance with the respirable dust control parameters specified in the approved mine ventilation plan shall:

(i) Certify by initials, date, and time on a board maintained at the section load-out or similar location showing that the examination was made prior to resuming production; and

(ii) Verify, by initials and date, the record of the results of the examination required under (a)(2) of this section to assure compliance with the respirable dust control parameters specified in the mine ventilation plan. The verification shall be made no later than the end of the shift for which the examination was made.

(3) The mine foreman or equivalent mine official shall countersign each examination record required under (a)(2) of this section after it is verified by the certified person under (g)(2)(ii) of this section, and no later than the end of the mine foreman's or equivalent mine official's next regularly scheduled working shift. The record shall be made in a secure book that is not susceptible to alteration or electronically in a computer system so as to be secure and not susceptible to alteration.

(4) Records shall be retained at a surface location at the mine for at least 1 year and shall be made available for inspection by authorized representatives of the Secretary and the representative of miners.

[61 FR 9829, Mar. 11, 1996; 61 FR 26442, May 28, 1996, as amended at 68 FR 40138, July 7, 2003; 77 FR 20715, Apr. 6, 2012; 79 FR 24987, May 1, 2014]

30 CFR §75.363

Hazardous conditions and violations of Mandatory Health and Safety standards; posting, correcting, and recording.

(a) Any hazardous condition found by the mine foreman or equivalent mine official, assistant mine foreman or equivalent mine official, or other certified persons designated by the operator for the purposes of conducting examinations under this subpart D, shall be

posted with a conspicuous danger sign where anyone entering the areas would pass. A hazardous condition shall be corrected immediately or the area shall remain posted until the hazardous condition is corrected. If the condition creates an imminent danger, everyone except those persons referred to in section 104(c) of the Act shall be withdrawn from the area affected to a safe area until the hazardous condition is corrected. Only persons designated by the operator to correct or evaluate the hazardous condition may enter the posted area. Any violation of a Mandatory Health and Safety standard found during a Pre-shift, supplemental, On-shift, or weekly examination shall be corrected.

(b) A record shall be made of any hazardous condition and any violation of the nine Mandatory Health and Safety standards found by the mine examiner. This record shall be kept in a book maintained for this purpose on the surface at the mine. The record shall be made by the completion of the shift on which the hazardous condition or violation of the nine Mandatory Health and Safety standards is found and shall include the nature and location of the hazardous condition or violation and the corrective action taken. This record shall not be required for shifts when no hazardous conditions or violations of the nine Mandatory Health and Safety standards are found.

(c) The record shall be made by the certified person who conducted the examination or a person designated by the operator. If made by a person other than the certified person, the certified person shall verify the record by initials and date by or at the end of the shift for which the examination was made. Records shall be countersigned by the mine foreman or equivalent mine official by the end of the mine foreman's or equivalent mine official's next regularly scheduled working shift. The record shall be made in a secure book that is not susceptible to alteration or electronically in a computer system so as to be secure and not susceptible to alteration.

(d) *Retention period.* Records shall be retained at a surface location at the mine for at least 1 year and shall be made available for inspection by authorized representatives of the Secretary and the representative of miners.

(e) Review of citations and orders. The mine operator shall review with mine examiners on a quarterly basis citations and orders issued in areas where Pre-shift, supplemental, On-shift, and weekly examinations are required.

[61 FR 9829, Mar. 11, 1996; 61 FR 26442, May 28, 1996; 77 FR 20715, Apr. 6, 2012]

30 CFR §75.364

Weekly examination.

(a) *Worked-out areas.* (1) At least every 7 days, a certified person shall examine unsealed worked-out areas where no pillars have been recovered by traveling to the area of deepest penetration; measuring methane and oxygen concentrations and air quantities and making tests to determine if the air is moving in the proper direction in the area. The locations of measurement points where tests and measurements will be performed shall be included in the mine ventilation plan and shall be adequate in number and location to assure ventilation and air quality in the area. Air quantity measurements shall also be made where the air enters and leaves the worked-out area. An alternative method of evaluating the ventilation of the area may be approved in the ventilation plan.

(2) At least every 7 days, a certified person shall evaluate the effectiveness of bleeder systems required by §75.334 as follows:

(i) Measurements of methane and oxygen concentrations and air quantity and a test to determine if the air is moving in its proper direction shall be made where air enters the worked-out area.

(ii) Measurements of methane and oxygen concentrations and air quantity and a test to determine if the air is moving in the proper direction shall be made immediately before the air enters a return split of air.

(iii) At least one entry of each set of bleeder entries used as part of a bleeder system under §75.334 shall be traveled in its entirety. Measurements of methane and oxygen concentrations and air quantities and a test to determine if the air is moving in the proper direction shall be made at the measurement point locations specified in the mine ventilation plan to determine the effectiveness of the bleeder system.

(iv) In lieu of the requirements of paragraphs (a)(2)(i) and (iii) of this section, an alternative method of evaluation may be specified in the ventilation plan provided the alternative method results in proper evaluation of the effectiveness of the bleeder system.

(b) *Hazardous conditions and violations of Mandatory Health and Safety standards.* At least every 7 days, an examination for hazardous conditions and violations of the (nine) Mandatory Health and Safety standards referenced in paragraph (b)(8) of this section shall be made by a certified person designated by the operator at the following locations:

(1) In at least one entry of each intake air course, in its entirety, so that the entire air course is traveled.

(2) In at least one entry of each return air course, in its entirety, so that the entire air course is traveled.

(3) In each longwall or shortwall travelway in its entirety, so that the entire travelway is traveled.

(4) At each seal along return and bleeder air courses and at each seal along intake air courses not examined under §75.360(b)(5).

(5) In each escapeway so that the entire escapeway is traveled.

(6) On each working section not examined under §75.360(b)(3) during the previous 7 days.

(7) At each water pump not examined during a Pre-shift examination conducted during the previous 7 days.

(8) Weekly examinations shall include examinations to identify violations of the standards listed below:

(i) §§75.202(a) and 75.220(a)(1) - Protection from falls of roof, face and ribs; roof control;

(ii) §§75.333(h) and 75.370(a)(1) – Ventilation controls; ventilation plan-control of methane and respirable dust;

(iii) §§75.400 and 75.403 - Accumulations of combustible materials and application of rock dust;

(iv) §75.1403 - Other safeguards, limited to maintenance of travelways along belt conveyors, off track haulage roadways, and track haulage, track switches, and other components for haulage;

(v) §75.1722(a) - Guarding moving machine parts; and

(vi) §75.1731(a) - Maintenance of belt conveyor components.

(c) *Measurements and tests.* At least every 7 days, a certified person shall -

(1) Determine the volume of air entering the main intakes and in each intake split;

(2) Determine the volume of air and test for methane in the last open crosscut in any pair or set of developing entries or rooms, in the return of each split of air immediately before it enters the main returns, and where the air leaves the main returns; and

(3) Test for methane in the return entry nearest each set of seals immediately after the air passes the seals.

(d) Hazardous conditions shall be corrected immediately. If the condition creates an imminent danger, everyone except those persons referred to in section 104(c) of the Act shall be withdrawn from the area affected to a safe area until the hazardous condition is corrected. Any violation of the nine Mandatory Health and Safety standards found during a weekly examination shall be corrected.

(e) The weekly examination may be conducted at the same time as the Pre-shift or On-shift examinations.

(f) (1) The weekly examination is not required during any 7 day period in which no one enters any underground area of the mine.

(2) Except for certified persons required to make examinations, no one shall enter any underground area of the mine if a weekly examination has not been completed within the previous 7 days.

(g) *Certification.* The person making the weekly examinations shall certify by initials, date, and the time that the examination was made. Certifications and times shall appear at enough locations to show that the entire area has been examined.

(h) *Recordkeeping.* At the completion of any shift during which a portion of a weekly examination is conducted, a record of the results of each weekly examination, including a record of hazardous conditions and violations of the nine Mandatory Health and Safety standards found during each examination and their locations, the corrective action taken, and the results and location of air and methane measurements, shall be made. The results of methane tests shall be recorded as the percentage of methane measured by the examiner. The record shall be made by the person making the examination or a person designated by the operator. If made by a person other than the examiner, the examiner shall verify the record by initials and date by or at the end of the shift for which the examination was made. The record shall be countersigned by the mine foreman or equivalent mine official by the end of the mine foreman's or equivalent mine official's next regularly scheduled working shift. The records required by this section shall be made in a secure book that is not

susceptible to alteration or electronically in a computer system so as to be secure and not susceptible to alteration.

(i) *Retention period.* Records shall be retained at a surface location at the mine for at least 1 year and shall be made available for inspection by authorized representatives of the Secretary and the representative of miners.

[61 FR 9829, Mar. 11, 1996, as amended at 77 FR 20715, Apr. 6, 2012]

30 CFR §75.370

Mine ventilation plan; submission and approval.

(a)(1) The operator shall develop and follow a ventilation plan approved by the district manager. The plan shall be designed to control methane and respirable dust and shall be suitable to the conditions and mining system at the mine. The ventilation plan shall consist of two parts, the plan content as prescribed in §75.371 and the ventilation map with information as prescribed in §75.372. Only that portion of the map which contains information required under §75.371 will be subject to approval by the district manager.

(2) The proposed ventilation plan and any revision to the plan shall be submitted in writing to the district manager. When revisions to a ventilation plan are proposed, only the revised pages, maps, or sketches of the plan need to be submitted. When required in writing by the district manager, the operator shall submit a fully revised plan by consolidating the plan and all revisions in an orderly manner and by deleting all outdated material.

(3)(i) The mine operator shall notify the representative of miners at least 5 days prior to submission of a mine ventilation plan and any revision to a mine ventilation plan. If requested, the mine operator shall provide a copy to the representative of miners at the time of notification. In the event of a situation requiring immediate action on a plan revision, notification of the revision shall be given, and if requested, a copy of the revision shall be provided, to the representative of miners by the operator at the time of submittal;

(ii) A copy of the proposed ventilation plan, and a copy of any proposed revision, submitted for approval shall be made available for inspection by the representative of miners; and

(iii) A copy of the proposed ventilation plan, and a copy of any proposed revision, submitted for approval shall be posted on the mine bulletin board at the time of submittal. The proposed plan or proposed revision shall remain posted until it is approved, withdrawn or denied.

(b) Following receipt of the proposed plan or proposed revision, the representative of miners may submit timely comments to the district manager, in writing, for consideration during the review process. A copy of these comments shall also be provided to the operator by the district manager upon request.

(c)(1) The district manager will notify the operator in writing of the approval or denial of approval of a proposed ventilation plan or proposed revision. A copy of this notification will be sent to the representative of miners by the district manager.

(2) If the district manager denies approval of a proposed plan or revision, the deficiencies of the plan or revision shall be specified in writing and the operator will be provided an opportunity to discuss the deficiencies with the district manager.

(d) No proposed ventilation plan shall be implemented before it is approved by the district manager. Any intentional change to the ventilation system that alters the main air current or any split of the main air current in a manner that could materially affect the safety and health of the miners, or any change to the information required in §75.371 shall be submitted to and approved by the district manager before implementation.

(e) Before implementing an approved ventilation plan or a revision to a ventilation plan, persons affected by the revision shall be instructed by the operator in its provisions.

(f) The approved ventilation plan and any revisions shall be--

(1) Provided upon request to the representative of miners by the operator following notification of approval;

(2) Made available for inspection by the representative of miners; and

(3) Posted on the mine bulletin board within 1 working day following notification of approval. The approved plan and revisions shall remain posted on the bulletin board for the period that they are in effect.

(g) The ventilation plan for each mine shall be reviewed every 6 months by an authorized representative of the Secretary to assure that it is suitable to current conditions in the mine.

30 CFR §75.371

Mine ventilation plan; contents.

The mine ventilation plan shall contain the information described below and any additional provisions required by the district manager:

(a) The mine name, company name, mine identification number, and the name of the individual submitting the plan information.

(b) Planned main mine fan stoppages, other than those scheduled for testing, maintenance or adjustment, including procedures to be followed during these stoppages and subsequent restarts (see §75.311(a)) and the type of device to be used for monitoring main mine fan pressure, if other than a pressure recording device (see §75.310(a)(4)).

(c) Methods of protecting main mine fans and associated components from the forces of

an underground explosion if a 15-foot offset from the nearest side of the mine opening is not provided (see §75.310(a)(6)); and the methods of protecting main mine fans and intake air openings if combustible material will be within 100 feet of the area surrounding the fan or these openings (see §75.311(f)).

(d) Persons that will be permitted to enter the mine, the work these persons will do while in the mine, and electric power circuits that will be energized when a back-up fan system is used that does not provide the ventilating quantity provided by the main mine fan (see §75.311(c)).

(e) The locations and operating conditions of booster fans installed in anthracite mines (see §75.302).

(f) Section and face ventilation systems used and the minimum quantity of air that will be delivered to the working section for each mechanized mining unit, including drawings illustrating how each system is used, and a description of each different dust suppression system used on equipment, identified by make and model, on each working section, including:

(1) The number, types, location, orientation, operating pressure, and flow rate of operating water sprays;

(2) The maximum distance that ventilation control devices will be installed from each working face when mining or installing roof bolts in entries and crosscuts;

(3) Procedures for maintaining the roof bolting machine dust collection system in approved condition; and

(4) Recommended best work practices for equipment operators to minimize dust exposure.

(g) Locations where the air quantities must be greater than 3,000 cubic feet per minute (see §75.325(a)(1)).

(h) In anthracite mines, locations where the air quantities must be greater than 1,500 cubic feet per minute (see §75.325(e)(1)).

(i) Working places and working faces other than those where coal is being cut, mined, drilled for blasting or loaded, where a minimum air quantity will be maintained, and the air quantity at those locations (see §75.325(a)(1)).

(j) The operating volume of machine mounted dust collectors or diffuser fans, if used (see §75.325(a)(3)), including the type and size of dust collector screen used, and a description of the procedures to maintain dust collectors used on equipment.

(k) The minimum mean entry air velocity in exhausting face ventilation systems where coal is being cut, mined, drilled for blasting, or loaded, if the velocity will be less than 60 feet per minute. Other working places where coal is not being cut, mined, drilled for

blasting or loaded, where at least 60 feet per minute or some other minimum mean entry air velocity will be maintained (see §75.326).

(l) The maximum distance if greater than 10 feet from each working face at which face ventilation control devices will be installed (see §75.330(b)(2)). The working places other than those where coal is being cut, mined, drilled for blasting or loaded, where face ventilation control devices will be used (see §75.330(b)(1)(ii).

(m) The volume of air required in the last open crosscut or the quantity of air reaching the pillar line if greater than 9,000 cubic feet per minute (see §75.325(b)).

(n) In anthracite mines, the volume of air required in the last open crosscut or the quantity of air reaching the pillar line if greater than 5,000 cubic feet per minute (see §75.325(e)(2)).

(o) Locations where separations of intake and return air courses will be built and maintained to other than the third connecting crosscut outby each working face (see §75.333(b)(1)).

(p) The volume of air required at the intake to the longwall sections, if different than 30,000 cubic feet per minute (see §75.325(c)).

(q) The velocities of air on a longwall or shortwall face, and the locations where the velocities must be measured (see §75.325(c)(2)).

(r) The minimum quantity of air that will be provided during the installation and removal of mechanized mining equipment, the location where this quantity will be provided, and the ventilation controls that will be used (see §75.325(d), (g), and (i)).

(s) The locations and frequency of the methane tests if required more often by §75.362(d)(1)(iii) (see §75.362 (d)(1)(iii).

(t) The locations where samples for "designated areas" will be collected, including the specific location of each sampling device, and the respirable dust control measures used at the dust generating sources for these locations (see §§70.207 and 70.209 of this chapter).

(u) The methane and dust control systems at underground dumps, crushers, transfer points, and haulageways.

(v) Areas in trolley haulage entries where the air velocity will be greater than 250 feet per minute and the velocity in these areas (see §75.327(b)).

(w) Locations where entries will be advanced less than 20 feet from the inby rib without a crosscut being provided where a line brattice will be required. (see §75.333(g)).

(x) A description of the bleeder system to be used, including its design (see §75.334).

(y) The means for determining the effectiveness of bleeder systems (see §75.334(c)(2)).

(z) The locations where measurements of methane and oxygen concentrations and air quantities and tests to determine whether the air is moving in the proper direction will be made to evaluate the ventilation of nonpillared worked-out areas (see §75.364 (a)(1)) and the effectiveness of bleeder systems (see §75.364 (a)(2)(iii). Alternative methods of evaluation of the effectiveness of bleeder systems (§75.364 (a)(2)(iv)).

(aa) The means for adequately maintaining bleeder entries free of obstructions such as roof falls and standing water (see §75.334(c)(3)).

(bb) The location of ventilation devices such as regulators, stoppings and bleeder connectors used to control air movement through worked-out areas (see §75.334(c)(4)). The location and sequence of construction of proposed seals for each worked-out area. (see §75.334(e)).

(cc) In mines with a demonstrated history of spontaneous combustion: a description of the measures that will be used to detect methane, carbon monoxide, and oxygen concentration during and after pillar recovery and in worked-out areas where no pillars have been recovered (see §75.334(f)(1); and, the actions which will be taken to protect miners from the hazards associated with spontaneous combustion (see §75.334(f)(2). If a bleeder system will not be used, the methods that will be used to control spontaneous combustion, accumulations of methane-air mixtures, and other gases, dusts, and fumes in the worked-out area (see §75.334(f)(3)).

(dd) The location of all horizontal degasification holes that are longer than 1,000 feet and the location of all vertical degasification holes.

(ee) If methane drainage systems are used, a detailed sketch of each system, including a description of safety precautions used with the systems.

(ff) Seal installation requirements provided by §75.335 and the sampling provisions provided by §75.336.

(gg) The alternative location for the additional sensing device if the device will not be installed on the longwall shearing machine (see §75.342(a)(2)).

(hh) The ambient level in parts per million of carbon monoxide, and the method for determining the ambient level, in all areas where carbon monoxide sensors are installed.

(ii) The locations (designated areas) where dust measurements would be made in the belt entry when belt air is used to ventilate working sections or areas where mechanized mining equipment is being installed or removed, in accordance with §75.350(b)(3).

(jj) The locations and approved velocities at those locations where air velocities in the belt entry are above or below the limits set forth in §75.350(a)(2) or §§75.350(b)(7) and 75.350(b)(8).

(kk) The locations where air quantities are measured as set forth in §75.350(b)(6).

(ll) The locations and use of point-feed regulators, in accordance with §§75.350(c) and 75.350(d)(5).

(mm) The location of any diesel-discriminating sensor, and additional carbon monoxide or smoke sensors installed in the belt air course.

(nn) The length of the time delay or any other method used to reduce the number of non-fire related alert and alarm signals from carbon monoxide sensors.

(oo) The reduced alert and alarm settings for carbon monoxide sensors, in accordance with §75.351(i)(2).

(pp) The alternate detector and the alert and alarm levels associated with the detector, in accordance with §75.352(e)(7).

(qq) The distance that separation between the primary escapeway and the belt or track haulage entries will be maintained if other than to the first connecting crosscut outby the section loading point (see §75.380(g)).

(rr) In anthracite mines, the dimensions of escapeways where the pitch of the coal seam does not permit escapeways to be maintained 4 feet by 5 feet and the locations where these dimensions must be maintained (see §75.381(c)(4)).

(ss) Areas designated by the district manager where measurements of CO and NO2 concentrations will be made (see §70.1900(a)(4)).

(tt) Location where the air quantity will be maintained at the section loading point (see §75.325(f)(2)).

(uu) Any additional location(s) required by the district manager where a minimum air quantity must be maintained for an individual unit of diesel-powered equipment. (see §75.325(f)(5)).

(vv) The minimum air quantities that will be provided where multiple units of diesel-powered equipment are operated (see §75.325(g) (1)-(3) and (i)).

(ww) The diesel-powered mining equipment excluded from the calculation under §75.325(g). (see §75.325(h)).

(xx) Action levels higher than the 50 percent level specified by §70.1900(c). (see §75.325(j)).
(yy) The locations where the pressure differential cannot be maintained from the primary escapeway to the belt entry.

[61 FR 9829, Mar. 11, 1996, as amended at 61 FR 55527, Oct. 25, 1996; 69 FR 17529, Apr. 2, 2004; 72 FR 28817, May 22, 2007; 73 FR 21209, Apr. 18, 2008; 73 FR 80613, Dec. 31, 2008; 79

FR 24987, May 1, 2014]

30 CFR §75.372

Mine ventilation map.

(a)(1) At intervals not exceeding 12 months, the operator shall submit to the district manager 3 copies of an up-to-date map of the mine drawn to a scale of not less than 100 nor more than 500 feet to the inch. A registered engineer or a registered surveyor shall certify that the map is accurate.

(2) In addition to the informational requirements of this section the map may also be used to depict and explain plan contents that are required in §75.371. Information shown on the map to satisfy the requirements of §75.371 shall be subject to approval by the district manager.

(b) The map shall contain the following information:

(1) The mine name, company name, mine identification number, a legend identifying the scale of the map and symbols used, and the name of the individual responsible for the information on the map.

(2) All areas of the mine, including sealed and unsealed worked-out areas.

(3) All known mine workings that are located in the same coalbed within 1,000 feet of existing or projected workings. These workings may be shown on a mine map with a scale other than that required by paragraph (a) of this section, if the scale does not exceed 2,000 feet to the inch and is specified on the map.

(4) The locations of all known mine workings underlying and overlying the mine property and the distance between the mine workings.

(5) The locations of all known oil and gas wells and all known drill holes that penetrate the coalbed being mined.

(6) The locations of all main mine fans, installed backup fans and motors, and each fan's specifications, including size, type, model number, manufacturer, operating pressure, motor horsepower, and revolutions per minute.

(7) The locations of all surface mine openings and the direction and quantity of air at each opening.

(8) The elevation at the top and bottom of each shaft and slope, and shaft and slope dimensions, including depth and length.

(9) The direction of air flow in all underground areas of the mine.

(10) The locations of all active working sections and the four-digit identification number

for each mechanized mining unit (MMU).

(11) The location of all escapeways and refuge alternatives.

(12) The locations of all ventilation controls, including permanent stoppings, overcasts, undercasts, regulators, seals, airlock doors, haulageway doors and other doors, except temporary ventilation controls on working sections.

(13) The direction and quantity of air—

(i) Entering and leaving each split;

(ii) In the last open crosscut of each set of entries and rooms; and

(iii) At the intake end of each pillar line, including any longwall or shortwall.

(14) Projections for at least 12 months of anticipated mine development, proposed ventilation controls, proposed bleeder systems, and the anticipated location of intake and return air courses, belt entries, and escapeways.

(15) The locations of existing methane drainage systems.

(16) The locations and type of all AMS sensors required by subpart D of this part.

(17) Contour lines that pass through whole number elevations of the coalbed being mined. These lines shall be spaced at 10-foot elevation levels unless a wider spacing is permitted by the district manager.

(18) The location of proposed seals for each worked-out area.

(19) The entry height, velocity and direction of the air current at or near the midpoint of each belt flight where the height and width of the entry are representative of the belt haulage entry.

(20) The location and designation of air courses that have been redesignated from intake to return for the purpose of ventilation of structures, areas or installations that are required by this subpart D to be ventilated to return air courses, and for ventilation of seals.

(c) The mine map required by §75.1200 may be used to satisfy the requirements for the ventilation map, provided that all the information required by this section is contained on the map.

[61 FR 9829, Mar. 11, 1996, as amended at 69 FR 17530, Apr. 2, 2004; 73 FR 80697, Dec. 31, 2008]

30 CFR §75.373

Reopening mines.

After a mine is abandoned or declared inactive, and before it is reopened, mining operations shall not begin until MSHA has been notified and has completed an inspection.

30 CFR §75.380 Escapeways; bituminous and lignite mines.

(a) Except in situations addressed in §75.381, §75.385 and §75.386, at least two separate and distinct travelable passageways shall be designated as escapeways and shall meet the requirements of this section.

(b) (1) Escapeways shall be provided from each working section, and each area where mechanized mining equipment is being installed or removed, continuous to the surface escape drift opening or continuous to the escape shaft or slope facilities to the surface.

(2) During equipment installation, these escapeways shall begin at the projected location for the section loading point. During equipment removal, they shall begin at the location of the last loading point.

(c) The two separate and distinct escapeways required by this section shall not end at a common shaft, slope, or drift opening, except that multiple compartment shafts or slopes separated by walls constructed of noncombustible material may be used as separate and distinct passageways.

(d) Each escapeway shall be -

(1) Maintained in a safe condition to always assure passage of anyone, including disabled persons;

(2) Clearly marked to show the route and direction of travel to the surface;

(3) Maintained to at least a height of 5 feet from the mine floor to the mine roof, excluding the thickness of any roof support, except that the escapeways shall be maintained to at least the height of the coalbed, excluding the thickness of any roof support, where the coalbed is less than 5 feet. In areas of mines where escapeways pass through doors, the height may be less than 5 feet, provided that sufficient height is maintained to enable miners, including disabled persons, to escape quickly in an emergency. In areas of mines developed before November 16, 1992, where escapeways pass over or under overcasts or undercasts, the height may be less than 5 feet provided that sufficient height is maintained to enable miners, including disabled persons, to escape quickly in an emergency. When there is a need to determine whether sufficient height is provided, MSHA may require a stretcher test where 4 persons carry a miner through the area in question on a stretcher;

(4) Maintained at least 6 feet wide except -

(i) Where necessary supplemental roof support is installed, the escapeway shall not be less than 4 feet wide; or

(ii) Where the route of travel passes through doors or other permanent ventilation controls, the escapeway shall be at least 4 feet wide to enable miners to escape quickly in an emergency, or

(iii) Where the alternate escapeway passes through doors or other permanent ventilation controls or where supplemental roof support is required and sufficient width is maintained to enable miners, including disabled persons, to escape quickly in an emergency. When there is a need to determine whether sufficient width is provided, MSHA may require a stretcher test where 4 persons carry a miner through the area in question on a stretcher, or

(iv) Where mobile equipment near working sections, and other equipment essential to the ongoing operation of longwall sections, is necessary during normal mining operations, such as material cars containing rock dust or roof control supplies, or is to be used for the evacuation of miners off the section in the event of an emergency. In any instance, escapeways shall be of sufficient width to enable miners, including disabled persons, to escape quickly in an emergency. When there is a need to determine whether sufficient width is provided, MSHA may require a stretcher test where 4 persons carry a miner through the area in question on a stretcher;

(5) Located to follow the most direct, safe and practical route to the nearest mine opening suitable for the safe evacuation of miners; and

(6) Provided with ladders, stairways, ramps, or similar facilities where the escapeways cross over obstructions.

(7) Provided with a continuous, durable directional lifeline or equivalent device that shall be -

(i) Installed and maintained throughout the entire length of each escapeway as defined in paragraph (b)(1) of this section;

(ii) Flame-resistant in accordance with the requirements of part 18 of this chapter upon replacement of existing lifelines; but in no case later than June 15, 2009;

(iii) Marked with a reflective material every 25 feet;

(iv) Located in such a manner for miners to use effectively to escape;

(v) Equipped with one directional indicator cone securely attached to the lifeline, signifying the route of escape, placed at intervals not exceeding 100 feet. Cones shall be installed so that the tapered section points inby;

(vi) Equipped with one sphere securely attached to the lifeline at each intersection where personnel doors are installed in adjacent crosscuts;

(vii) Equipped with two securely attached cones, installed consecutively with the tapered section pointing inby, to signify an attached branch line is immediately ahead.

(A) A branch line leading from the lifeline to an SCSR cache will be marked with four cones with the base sections in contact to form two diamond shapes. The cones must be placed within reach of the lifeline.

(B) A branch line leading from the lifeline to a refuge alternative will be marked with a rigid spiraled coil at least eight inches in length. The spiraled coil must be placed within reach of the lifeline (see Illustration 1 below).

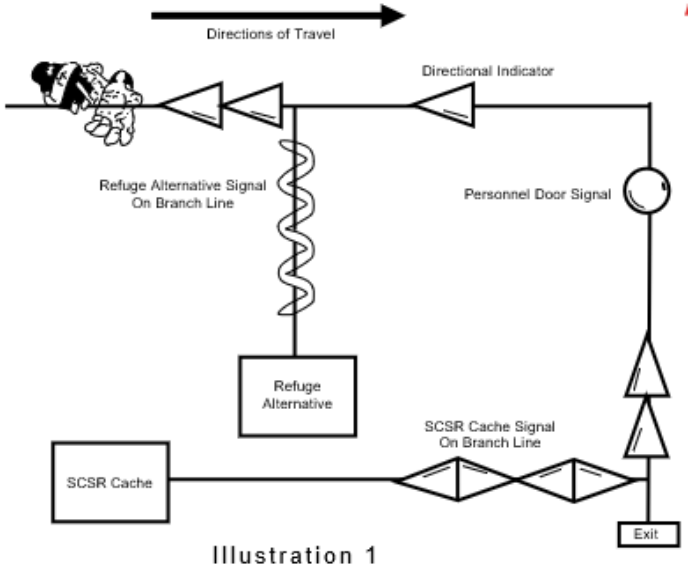

Illustration 1

(e) Surface openings shall be adequately protected to prevent surface fires, fumes, smoke, and flood water from entering the mine.

(f) *Primary escapeway.*

(1) One escapeway that is ventilated with intake air shall be designated as the primary escapeway. The primary escapeway shall have a higher ventilation pressure than the belt entry unless the mine operator submits an alternative in the mine ventilation plan to protect the integrity of the primary escapeway, based on mine specific conditions, which is approved by the district manager.

(2) Paragraphs (f)(3) through (f)(7) of this section apply as follows:

(i) To all areas of a primary escapeway developed on or after November 16, 1992;

(ii) Effective as of June 10, 1997, to all areas of a primary escapeway developed between March 30, 1970 and November 16, 1992; and

(iii) Effective as of June 10, 1997, to all areas of the primary escapeway developed prior to March 30, 1970 where separation of the belt and trolley haulage entries from the primary escapeway existed prior to November 16, 1992.

(3) The following equipment is not permitted in the primary escapeway:

(i) Mobile equipment hauling coal except for hauling coal incidental to cleanup or maintenance of the primary escapeway.

(ii) Compressors, except -

(A) Compressors necessary to maintain the escapeway in safe, travelable condition;

(B) Compressors that are components of equipment such as locomotives and rock dusting machines; and

(C) Compressors of less than five horsepower.

(iii) Underground transformer stations, battery charging stations, substations, and rectifiers except -

(A) Where necessary to maintain the escapeway in safe, travelable condition; and

(B) Battery charging stations and rectifiers and power centers with transformers that are either dry-type or contain nonflammable liquid, provided they are located on or near a working section and are moved as the section advances or retreats.

(iv) Water pumps, except -

(A) Water pumps necessary to maintain the escapeway in safe, travelable condition;

(B) Submersible pumps;

(C) Permissible pumps and associated permissible switchgear;

(D) Pumps located on or near a working section that are moved as the section advances or retreats;

(E) Pumps installed in anthracite mines; and

(F) Small portable pumps.

(4) Mobile equipment operated in the primary escapeway, except for continuous miners and as provided in paragraphs (f)(5), (f)(6), and (f)(7) of this section, shall be equipped with a fire suppression system installed according to §§75.1107-3 through 75.1107-16 that is -

(i) Manually operated and attended continuously by a person trained in the systems function and use, or

(ii) A multipurpose dry chemical type capable of both automatic and manual activation.

(5) Personnel carriers and small mobile equipment designed and used only for carrying people and small hand tools may be operated in primary escapeways if -

(i) The equipment is provided with a multipurpose dry chemical type fire suppression system capable of both automatic and manual activation, and the suppression system is suitable for the intended application and is listed or approved by a nationally recognized independent testing laboratory, or,

(ii) Battery powered and provided with two 10 pound multipurpose dry chemical portable fire extinguishers.

(6) Notwithstanding the requirements of paragraph (f)(3)(i), mobile equipment not provided with a fire suppression system may operate in the primary escapeway if no one is inby except those persons directly engaged in using or moving the equipment.

(7) Notwithstanding the requirements of paragraph (f)(3)(i), mobile equipment designated and used only as emergency vehicles or ambulances, may be operated in the primary escapeway without fire suppression systems.

(g) Except where separation of belt and trolley haulage entries from designated escapeways did not exist before November 15, 1992, and except as provided in §75.350(c), the primary escapeway must be separated from belt and trolley haulage entries for its entire length, to and including the first connecting crosscut outby each loading point except when a greater or lesser distance for this separation is specified and approved in the mine ventilation plan and does not pose a hazard to miners.

(h) *Alternate escapeway.* One escapeway shall be designated as the alternate escapeway. The alternate escapeway shall be separated from the primary escapeway for its entire length, except that the alternate and primary escapeways may be ventilated from a common intake air shaft or slope opening.

(i) Mechanical escape facilities shall be provided and maintained for -

(1) Each shaft that is part of a designated escapeway and is greater than 50 feet in depth; and

(2) Each slope from the coal seam to the surface that is part of a designated escapeway and is inclined more than 9 degrees from the horizontal.

(j) Within 30 minutes after mine personnel on the surface have been notified of an emergency requiring evacuation, mechanical escape facilities provided under paragraph (i) of this section shall be operational at the bottom of shaft and slope openings that are part of escapeways.

(k) Except where automatically activated hoisting equipment is used, the bottom of each shaft or slope opening that is part of a designated escapeway shall be equipped with a means of signaling a surface location where a person is always on duty when anyone is underground. When the signal is activated or the evacuation of persons underground is necessary, the person shall assure that mechanical escape facilities are operational as required by paragraph (j) of this section.

(l)(1) Stairways or mechanical escape facilities shall be installed in shafts that are part of the designated escapeways and that are 50 feet or less in depth, except ladders may be used in shafts that are part of the designated escapeways and that are 5 feet or less in depth.

(2) Stairways shall be constructed of concrete or metal, set on an angle not to exceed 45 degrees from the horizontal, and equipped on the open side with handrails. In addition, landing platforms that are at least 2 feet by 4 feet shall be installed at intervals not to exceed 20 vertical feet on the stairways and equipped on the open side with handrails.

(3) Ladders shall be constructed of metal, anchored securely, and set on an angle not to exceed 60 degrees from the horizontal.

(m) A travelway designed to prevent slippage shall be provided in slope and drift openings that are part of designated escapeways, unless mechanical escape facilities are installed.

[61 FR 9829, Mar. 11, 1996; 61 FR 20877, May 8, 1996, as amended at 61 FR 55527, Oct. 25, 1996; 69 FR 17530, Apr. 2, 2004; 71 FR 12269, Mar. 9, 2006; 71 FR 71452, Dec. 8, 2006; 73 FR 80613, Dec. 31, 2008]

30 CFR §75.384

Longwall and shortwall travelways.

(a) If longwall or shortwall mining systems are used and the two designated escapeways required by §75.380 are located on the headgate side of the longwall or shortwall, a travelway shall be provided on the tailgate side of that longwall or shortwall. The travelway shall be located to follow the most direct and safe practical route to a designated escapeway.

(b) The route of travel shall be clearly marked.

(c) When a roof fall or other blockage occurs that prevents travel in the travelway--

(1) Work shall cease on the longwall or shortwall face;

(2) Miners shall be withdrawn from face areas to a safe area outby the section loading point; and

(3) MSHA shall be notified.

(d) Work may resume on the longwall or shortwall face after the procedures set out in §§75.215 and 75.222 are implemented.

30 CFR §75.385

Opening new mines.

When new mines are opened, no more than 20 miners at a time shall be allowed in any mine until a connection has been made between the mine openings, and these connections shall be made as soon as possible.

30 CFR §75.386

Final mining of pillars.

When only one mine opening is available due to final mining of pillars, no more than 20 miners at a time shall be allowed in the mine, and the distance between the mine opening and working face shall not exceed 500 feet.

30 CFR §75.388

Boreholes in advance of mining.

(a) Boreholes shall be drilled in each advancing working place when the working place approaches--

(1) To within 50 feet of any area located in the mine as shown by surveys that are certified by a registered engineer or registered surveyor unless the area has been Pre-shift examined;

(2) To within 200 feet of any area located in the mine not shown by surveys that are certified by a registered engineer or registered surveyor unless the area has been Pre-shift examined; or

(3) To within 200 feet of any mine workings of an adjacent mine located in the same coalbed unless the mine workings have been Pre-shift examined.

(b) Boreholes shall be drilled as follows:

(1) Into the working face, parallel to the rib, and within 3 feet of each rib.

(2) Into the working face, parallel to the rib, and at intervals across the face not to exceed 8 feet.

(3) At least 20 feet in depth in advance of the working face, and always maintained to a distance of 10 feet in advance of the working face.

(c) Boreholes shall be drilled in both ribs of advancing working places described in paragraph (a) of this section unless an alternative drilling plan is approved by the District Manager in accordance with paragraph (g) of this section. These boreholes shall be drilled--

(1) At an angle of 45 degrees to the direction of advance;

(2) At least 20 feet in depth; and

(3) At intervals not to exceed 8 feet.

(d) When a borehole penetrates an area that cannot be examined, and before mining continues, a certified person shall, if possible, determine--

(1) The direction of airflow in the borehole;

(2) The pressure differential between the penetrated area and the mine workings;

(3) The concentrations of methane, oxygen, carbon monoxide, and carbon dioxide; and

(4) Whether water is impounded within the penetrated area.

(e) Unless action is taken to dewater or to ventilate penetrated areas, boreholes shall be plugged with wooden plugs or similar devices when--

(1) Tests conducted at the boreholes show that the atmosphere in the penetrated area contains more than 1.0 percent methane, less than 19.5 percent oxygen, or

harmful concentrations of carbon monoxide, carbon dioxide or other explosive, harmful or noxious gases;

(2) Tests for methane, oxygen, carbon monoxide, and carbon dioxide cannot be made because air from mine workings is flowing into the penetrated area; or

(3) Water is discharging through the boreholes from the penetrated area into the mine workings.

(f) If mining is to be conducted within 50 feet above or below an inaccessible area of another mine, boreholes shall be drilled, as necessary, according to a plan approved by the district manager.

(g) Alternative borehole patterns that provide the same protection to miners as the pattern established by paragraphs (b) and (c) of this section may be used under a plan approved by the district manager.

30 CFR §75.389

Mining into inaccessible areas.

(a)(1) The operator shall develop and follow a plan for mining into areas penetrated by boreholes drilled under §75.388.

(2) Mining shall not resume into any area penetrated by boreholes until conditions in the penetrated area can be determined under §75.388 and the plan for mining-through into the area has been approved by the district manager.

(3) A copy of the procedures to be followed shall be posted near the site of the mining-through operations and the operator shall explain these procedures to all miners involved in the operations.

(b) The procedures specified in the plan shall include--

(1) The method of ventilation, ventilation controls, and the air quantities and velocities in the affected working section and working place;

(2) Dewatering procedures to be used if a penetrated area contains a water accumulation; and

(3) The procedures and precautions to be followed during mining-through operations.

(c) Except for routine mining-through operations that are part of a retreat section ventilation system approved in accordance with §75.371(f) and (x), the following provisions shall apply:

(1) Before and during mining-through operations, a certified person shall perform air quality tests at intervals and at locations necessary to protect the safety of the

miners.
(2) During mining-through operations, only persons involved in these operations shall be permitted in the mine; and

(3) After mining-through, a certified person shall determine that the affected areas are safe before any persons enter the underground areas of the mine.

Subpart E – Combustible Materials and Rock Dusting

30 CFR §75.400

Accumulation of combustible materials.

Coal dust, including float coal dust deposited on rock-dusted surfaces, loose coal, and other combustible materials, shall be cleaned up and not be permitted to accumulate in active workings, or on diesel- powered and electric equipment therein.

[61 FR 55527, Oct. 25, 1996]

30 CFR §75.400-1

Definitions.

(a) The term *coal dust* means particles of coal that can pass a No. 20 sieve.

(b) The term *float coal dust* means the coal dust consisting of particles of coal that can pass a No. 200 sieve.

(c) The term *loose coal* means coal fragments larger in size than coal dust.

30 CFR §75.400-2

Cleanup program.

A program for regular cleanup and removal of accumulations of coal and float coal dusts, loose coal, and other combustibles shall be established and maintained. Such program shall be available to the Secretary or authorized representative.

30 CFR §75.401

Abatement of dust; water or water with a wetting agent.

Where underground mining operations in active workings create or raise excessive amounts of dust, water or water with a wetting agent added to it, or other no less effective methods approved by the Secretary or his authorized representative, shall be used to abate such dust. In working places, particularly in distances less than 40 feet from the face,

water, with or without a wetting agent, or other no less effective methods approved by the Secretary or his authorized representative, shall be applied to coal dust on the ribs, roof, and floor to reduce dispersibility and to minimize the explosion hazard.

30 CFR §75.401-1

Excessive amounts of dust.

The term "excessive amounts of dust" means coal and float coal dust in the air in such amounts as to create the potential of an explosion hazard.

30 CFR §75.402

Rock dusting.

All underground areas of a coal mine, except those areas in which the dust is too wet or too high in incombustible content to propagate an explosion, shall be rock dusted to within 40 feet of all working faces, unless such areas are inaccessible or unsafe to enter or unless the Secretary or his authorized representative permits an exception upon his finding that such exception will not pose a hazard to the miners. All crosscuts that are less than 40 feet from a working face shall also be rock dusted.

30 CFR §75.402-1

Definition.

The term *too wet* means that sufficient natural moisture is retained by the dust that when a ball of finely divided material is squeezed in the hands water is exuded.

30 CFR §75.403

Maintenance of incombustible content of rock dust.

Where rock dust is required to be applied, it shall be distributed upon the top, floor, and sides of all underground areas of a coal mine and maintained in such quantities that the incombustible content of the combined coal dust, rock dust, and other dust shall be not less than 80 percent. Where methane is present in any ventilating current, the percent of incombustible content of such combined dust shall be increased 0.4 percent for each 0.1 percent of methane.

[75 FR 57857, Sept. 23, 2010; 76 FR 35978, June 21, 2011]

30 CFR §75.403-1

Incombustible content.

Moisture contained in the combined coal dust, rock dust and other dusts shall be considered as a part of the incombustible content of such mixture.

Subpart F--Electrical Equipment--General

30 CFR §75.500

Permissible electric equipment.

On and after March 30, 1971:

(a) All junction or distribution boxes used for making multiple power connections inby the last open crosscut shall be permissible;

(b) All handheld electric drills, blower and exhaust fans, electric pumps, and such other low horsepower electric face equipment as the Secretary may designate on or before May 30, 1970, which are taken into or used inby the last open crosscut of any coal mine shall be permissible;

(c) All electric face equipment which is taken into or used inby the last open crosscut of any coal mine classified under any provision of law as gassy prior to March 30, 1970, shall be permissible; and

(d) All other electric face equipment which is taken into or used inby the last crosscut of any coal mine, except a coal mine referred to in §75.501, which has not been classified under any provision of law as a gassy mine prior to March 30, 1970, shall be permissible.

30 CFR §75.500-1

Other low horsepower electric face equipment.

Other low horsepower electric face equipment designated pursuant to the provisions of §75.500(b) is all other electric-driven mine equipment, except low horsepower rock dusting equipment, and employs an electric current supplied by either a power conductor or battery and consumes not more than 2,250 watts of electricity and which is taken into or used inby the last open crosscut.

30 CFR §75.501

Permissible electric face equipment; coal seams above water table.

On and after March 30, 1974, all electric face equipment, other than equipment referred to in paragraph (b) of §75.500, which is taken into and used inby the last open crosscut of any coal mine which is operated entirely in coal seams located above the water table and which has not been classified under any provision of law as a gassy mine prior to March 30, 1970, and in which one or more openings were made prior to December 30, 1969, shall be permissible.

30 CFR §75.501-1

Coal seams above the water table.

As used in §75.501, the phrase "coal seams above the water table" means coal seams in a mine which are located at an elevation above a river or the tributary of a river into which a local surface water system naturally drains.

30 CFR §75.501-2

Permissible electric face equipment.

(a) On and after March 30, 1971, in mines operated entirely in coal seams which are located at elevations above the water table:

(a) (1) All junction or distribution boxes used for making multiple power connections inby the last open crosscut shall be permissible; and

(a) (2) All handheld electric drills, blower and exhaust fans, electric pumps, and all other electric-driven mine equipment, except low horsepower rock dusting equipment, that employs an electric current supplied by either a power conductor or battery and consumes not more than 2,250 watts of electricity, which is taken into or used inby the last open crosscut shall be permissible.

(b) On and after March 30, 1974, in mines operated entirely in coal seams which are located at elevations above the water table, all electric face equipment which is taken into or used inby the last crosscut shall be permissible.

30 CFR §75.501-3

New openings; mines above water table and never classed gassy.

(a) Where a new opening(s) is proposed to be developed by shaft, slope, or drift from the surface to, or in, any coalbed and the operator considers such proposed new opening(s) to be a part of a mine coming under section 305(a)(2) of the Act and §75.501 the operator shall so notify the District Manager for the District in which the mine is located in writing prior to the date any actual development (in coal) through such opening(s) is undertaken. Such notification shall include the following information:

(1) Name, address, and identification number of the existing mine.

(2) A current map of the existing mine clearly setting out the proposed new opening(s), mining plan and planned interconnection, if any, with existing workings.

(3) A statement as to when the operator obtained the right to mine the coal which the proposed new opening(s) will traverse.

(4) The name of the coalbeds currently being mined and those which the new opening(s) will traverse.

(5) The expected life of the mine.

(6) The reason(s) for the proposed new opening(s) (for example, haulage, ventilation, drainage, to avoid bad roof, escapeway).

The District Manager shall require submission of any additional information he considers pertinent.

(a) The District Manager shall make a determination based on all of the information submitted by the operator as to whether the proposed new opening(s) will be considered as a part of the existing mine or as a new mine. The following guidelines and criteria shall be used by the District Manager in making his determination:

(1) The effect that the proposed new opening(s) will have on the safety of the men working in the existing mine shall be considered of primary importance.

(2) Whether the operator had a right to mine the coal which the proposed new openings will traverse prior to the date of enactment of the Act (December 30, 1969) and whether the original mining plan included mining such coal.

(3) Whether, in accordance with the usual mining practices common to the particular district, the proposed new openings would have been considered a new mine or part of the existing mine. A number of factors will be considered including, but not limited to:

(i) The relationship between the coalbeds currently being mined, and those proposed to be mined;

(ii) The distance between existing openings and the proposed new opening(s);

(iii) The projected time elapsing between the start of the new opening(s) and planned interconnection, if any, with the existing mine; and

(iv) The projected tonnage of coal which is expected to be mined prior to interconnection where interconnection is planned.

The District Manager shall notify the operator in writing within 30 days of receiving all of the information, required and requested, of his determination. No informal notification shall be given.

(b) All new opening(s) shall be operated as a new mine prior to receiving a written notification from the District Manager that such new opening(s) will be considered part of an existing mine coming under section 305(a)(2) of the Act and §75.501.

(c) Nothing in this §75.501-3 shall be construed to relieve the operator from compliance with any of the mandatory standards contained in this Part 75.

[37 FR 8949, May 3, 1972]

30 CFR §75.502

Permits for noncompliance.

An operator need not comply with paragraph (d) of §75.500 or with §75.501 during the period of time specified in a permit issued by the Interim Compliance Panel established by the Act.

30 CFR §75.503

Permissible electric face equipment; maintenance.

The operator of each coal mine shall maintain in permissible condition all electric face equipment required by §§75.500, 75.501, 75.504 to be permissible which is taken into or used inby the last open crosscut of any such mine.

30 CFR §75.503-1

Statement listing all electric face equipment.

Each operator of a coal mine shall complete and file Mine Safety and Health Administration Form No. 6-1496 entitled "Coal Operator's Electrical Survey" and Form 6-1496 Supplemental entitled "Operator's Survey of Electrical Face Equipment." Forms may be obtained from any MSHA Coal Mine Safety and Health district office. Separate forms shall be filed for each mine. Copies one and two of the completed form shall be filed with the Coal Mine District Manager for the district in which each mine is located on or before May 30, 1970. An operator must list all electric face equipment being used at each mine as of the time of filing, all such equipment being repaired, and all standby electric equipment stored at or in the mine which the operator intends to use as face equipment.

[35 FR 17890, Nov. 20, 1970, as amended at 71 FR 16668, Apr. 3, 2006]

30 CFR §75.504

Permissibility of new, replacement, used, reconditioned, additional, and rebuilt electric face equipment.

On and after March 30, 1971, all new, replacement, used, reconditioned, and additional electric face equipment used in any mine referred to in §§75.500, 75.501, and 75.503 shall be permissible and shall be maintained in a permissible condition, and in the event of any major overhaul of any item of electric face equipment in use on or after March 30, 1971, such equipment shall be put in, and thereafter maintained in, a permissible condition, unless in the opinion of the Secretary, such equipment or necessary replacement parts are not available.

[38 FR 4975, Feb. 23, 1973]

30 CFR §75.505

Mines classed gassy; use and maintenance of permissible electric face equipment.

Any coal mine which, prior to March 30, 1970, was classed gassy under any provision of law and was required to use permissible electric face equipment and to maintain such equipment in a permissible condition shall continue to use such equipment and to maintain such equipment in such condition.

30 CFR §75.506

Electric face equipment; requirements for permissibility.

(a) Electric-driven mine equipment and accessories manufactured on or after March 30, 1973, will be permissible electric face equipment only (1) if they are fabricated, assembled, or built under an approval, or any extension thereof, issued by the Bureau of Mines or the Mine Safety and Health Administration in accordance with schedule 2G, or any subsequent Bureau of Mines schedule promulgated by the Secretary after March 30, 1970, which amends, modifies, or supersedes the permissibility requirements of schedule 2G, and (2) if they are maintained in a permissible condition.

(b) Except as provided in paragraph (c) of this §75.506 electric-driven mine equipment and accessories manufactured prior to March 30, 1973, will be permissible electric face equipment (1) if they were fabricated, assembled, or built under an approval, or any extension thereof, issued by the Bureau of Mines in accordance with the schedules set forth below, and (2) if they are maintained in a permissible condition.

Bureau of Mines Schedule 2D, May 23, 1936;

Bureau of Mines Schedule 2E, February 15, 1945;

Bureau of Mines Schedule 2F, August 3, 1955; and

Bureau of Mines Schedule 2G, March 19, 1968.

Copies of these schedules are available at all MSHA Coal Mine Safety and Health district offices.

(c) Electric driven mine equipment and accessories bearing the Bureau of Mines approval numbers listed in Appendix A to this subpart are permissible electric face equipment only if they are maintained in a permissible condition.

(d) The following equipment will be permissible electric face equipment only if it is approved under the appropriate parts of this chapter, or former Bureau of Mines' approval schedules, and if it is in permissible condition:

(1) Multiple-Shot Blasting Units, part 7 subpart D;

(2) Electric Cap Lamps, part 19;

(3) Electric Mine Lamps Other than Standard Cap Lamps, part 20;

(4) Flame Safety Lamps;

(5) Portable Methane Detectors, part 22;

(6) Telephone and Signaling Devices, part 23;

(7) Single-Shot Blasting Units;

(8) Lighting Equipment for Illuminating Underground Workings;

(9) Methane-Monitoring Systems, part 27; and

(10) Continuous Duty, Warning Light, Portable Methane Detectors, 30 CFR part 29 contained in the 30 CFR, parts 1-199, edition, revised as of July 1, 1999.

[35 FR 17890, Nov. 20, 1970, as amended at 63 FR 47119, Sept. 3, 1998; 64 FR 43283, Aug. 10, 1999; 71 FR 16668, Apr. 3, 2006]

30 CFR §75.506-1

Electric face equipment; permissible condition; maintenance requirements.

(a) Except as provided in paragraph (b) of this section, electric face equipment which meets the requirements for permissibility set forth in §75.506 will be considered to be in permissible condition only if it is maintained so as to meet the requirements for permissibility set forth in the Bureau of Mines schedule under which such electric face equipment was initially approved, or, if the equipment has been modified, it is maintained so as to meet the requirements of the schedule under which such modification was approved.

(b) Electric face equipment bearing the Bureau of Mines approval number listed in Appendix A of this subpart will be considered to be in permissible condition only if it is maintained so as to meet the requirements for permissibility set forth in Bureau of Mines Schedule 2D or, if such equipment has been modified, it is maintained so as to meet the requirements of the schedule under which the modification was approved.

(c) Notwithstanding the provisions of paragraphs (a) and (b) of this section, where the minimum requirements for permissibility set forth in the appropriate Bureau of Mines schedule under which such equipment or modifications were approved have been superseded by the requirements of this Part 75, the latter requirements shall be applicable.

30 CFR §75.507

Power connection points.

Except where permissible power connection units are used, all power-connection points outby the last open crosscut shall be in intake air.

30 CFR §75.507-1

Electric equipment other than power-connection points; outby the last open crosscut; return air; permissibility requirements.

(a) All electric equipment, other than power-connection points, used in return air outby the last open crosscut in any coal mine shall be permissible except as provided in paragraphs (b) and (c) of this section.

(b) Notwithstanding the provisions of paragraph (a) of this section, in any coal mine where nonpermissible electric face equipment may be taken into or used inby the last open crosscut until March 30, 1974, such nonpermissible electric face equipment may be used in return air outby the last open crosscut.

(c) Notwithstanding the provisions of paragraph (a) of this section, in any coal mine where a permit for noncompliance is in effect, nonpermissible electric face equipment specified in such permit for noncompliance may be used in return air outby the last open crosscut for the duration of such permit.

[38 FR 4975, Feb. 23, 1973]

30 CFR §75.508

Map of electrical system.

The location and the electrical rating of all stationary electric apparatus in connection with the mine electric system, including permanent cables, switchgear, rectifying substations, transformers, permanent pumps, and trolley wires and trolley feeder wires, and settings of all direct-current circuit breakers protecting underground trolley circuits, shall be shown on a mine map. Any changes made in a location, electric rating, or setting shall be promptly shown on the map when the change is made. Such map shall be available to an authorized representative of the Secretary and to the miners in such mine.

30 CFR §75.508-1

Mine tracks.

When mine track is used as a conductor of a trolley system, the location of such track shall be shown on the map required by §75.508, with a notation of the number of rails and the size of such track expressed in pounds per yard.

30 CFR §75.508-2

Changes in electric system map; recording.

Changes made in the location, electrical rating or setting within the mine electrical system shall be recorded on the map of such system no later than the end of the next workday following completion of such changes.

30 CFR §75.509

Electric power circuit and electric equipment; de-energization.

All power circuits and electric equipment shall be de-energized before work is done on such circuits and equipment, except when necessary for trouble shooting or testing.

30 CFR §75.510

Energized trolley wires; repair.

Energized trolley wires may be repaired only by a person trained to perform electrical work and to maintain electrical equipment and the operator of a mine shall require that such person wear approved and tested insulated shoes and wireman's gloves.

30 CFR §75.510-1

Repair of energized trolley wires; training.

The training referred to in §75.510 must include training in the repair and maintenance of live trolley wires, and in the hazards involved in making such repairs, and in the limitations of protective clothing used to protect against such hazards.

30 CFR §75.511

Low-, medium-, or high-voltage distribution circuits and equipment; repair.

No electrical work shall be performed on low-, medium-, or high-voltage distribution circuits or equipment, except by a qualified person or by a person trained to perform electrical work and to maintain electrical equipment under the direct supervision of a qualified person. Disconnecting devices shall be locked out and suitably tagged by the persons who perform such work, except that in cases where locking out is not possible, such devices shall be opened and suitably tagged by such persons. Locks or tags shall be removed only by the persons who installed them or, if such persons are unavailable, by persons authorized by the operator or his agent.

30 CFR §75.511-1

Qualified person.

To be a qualified person within the meaning of §75.511, an individual must meet the requirements of §75.153.

30 CFR §75.512

Electric equipment; examination, testing and maintenance.

All electric equipment shall be frequently examined, tested, and properly maintained by a qualified person to assure safe operating conditions. When a potentially dangerous condition is found on electric equipment, such equipment shall be removed from service until such condition is corrected. A record of such examinations shall be kept and made available to an authorized representative of the Secretary and to the miners in such mine.

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14706, Apr. 6, 1982; 60 FR 33719, June 29, 1995]

30 CFR §75.512-1

Qualified person.

To be a qualified person within the meaning of §75.512, an individual must meet the requirements of §75.153.

30 CFR §75.512-2

Frequency of examinations.

The examinations and tests required by §75.512 shall be made at least weekly. Permissible equipment shall be examined to see that it is in permissible condition.

30 CFR §75.513

Electric conductor; capacity and insulation.

All electric conductors shall be sufficient in size and have adequate current carrying capacity and be of such construction that a rise in temperature resulting from normal operation will not damage the insulating materials.

30 CFR §75.513-1

Electric conductor; size.

An electric conductor is not of sufficient size to have adequate carrying capacity if it is

smaller than is provided for in the National Electric Code, 1968. In addition, equipment and trailing cables that are required to be permissible must meet the requirements of the appropriate schedules of the Bureau of Mines.

30 CFR §75.514

Electrical connections or splices; suitability.

All electrical connections or splices in conductors shall be mechanically and electrically efficient, and suitable connectors shall be used. All electrical connections or splices in insulated wire shall be reinsulated at least to the same degree of protection as the remainder of the wire.

30 CFR §75.515

Cable fittings; suitability.

Cables shall enter metal frames of motors, splice boxes, and electric compartments only through proper fittings. When insulated wires other than cables pass through metal frames, the holes shall be substantially bushed with insulated bushings.

30 CFR §75.516

Power wires; support.

All power wires (except trailing cables on mobile equipment, specially designed cables conducting high-voltage power to underground rectifying equipment or transformers, or bare or insulated ground and return wires) shall be supported on well-insulated insulators and shall not contact combustible material, roof, or ribs.

30 CFR §75.516-1

Installed insulators.

Well-insulated insulators is interpreted to mean well-installed insulators. Insulated J-hooks may be used to suspend insulated power cables for temporary installation not exceeding 6 months and for permanent installation of control cables such as may be used along belt conveyors.

30 CFR §75.516-2

Communication wires and cables; installation; insulation; support.

(a) All communication wires shall be supported on insulated hangers or insulated J-hooks.

(b) All communication cables shall be insulated as required by §75.517-1, and shall either be supported on insulated or uninsulated hangers or J-hooks, or securely attached to

messenger wires, or buried, or otherwise protected against mechanical damage in a manner approved by the Secretary or his authorized representative.

(c) All communication wires and cables installed in track entries shall, except when a communication cable is buried in accordance with paragraph (b) of this section, be installed on the side of the entry opposite to trolley wires and trolley feeder wires. Additional insulation shall be provided for communication circuits at points where they pass over or under any power conductor.

(d) For purposes of this section, communication cable means two or more insulated conductors covered by an additional abrasion-resistant covering.

[38 FR 4975, Feb. 23, 1973]

30 CFR §75.517

Power wires and cables; insulation and protection.

Power wires and cables, except trolley wires, trolley feeder wires, and bare signal wires, shall be insulated adequately and fully protected.

30 CFR §75.517-1

Power wires and cables; insulation and protection.

Power wires and cables installed on or after March 30, 1970, shall have insulation with a dielectric strength at least equal to the voltage of the circuit.

30 CFR §75.517-2

Plans for insulation of existing bare power wires and cables.

(a) On or before December 31, 1970, plans for the insulation of existing bare power wires and cables installed prior to March 30, 1970, shall be filed with the District Manager of the Coal Mine Safety District in which the mine is located to permit approval and prompt implementation of such plans.

(b) The appropriate District Manager shall notify the operator in writing of the approval of a proposed insulation plan. If revisions are required for approval, the changes required will be specified.

(c) An insulation plan shall include the following information:

(1) Name and address of the company, the mine and the responsible officials;

(2) Map or diagram indicating location of power wires and cables required to be insulated;

(3) Total length of bare power wires and cables required to be insulated;

(4) Schedule for the replacement or insulation of bare power wires and cables;

(5) Type of insulation to be used and the voltage rating as indicated by the manufacturer.

(d) The District Manager shall be guided by the following criteria in approving insulation plans on a mine-by-mine basis. Insulation not conforming to these criteria may be approved provided the operator can satisfy the Mine Safety and Health Administration that the insulation will provide no less than the same measure of protection.

(1) Insulation shall be adequate for the applied voltage of the circuit.

(2) When tubing is used to insulate existing power wires and cables, it shall have a dielectric strength at least equal to the voltage of the circuit. When the tubing is split for purposes of installation, the joints shall be effectively sealed. The butt ends may be sealed with a moisture resistant insulating tape.

(3) When tape is used to insulate existing power wires and cables, it shall be applied half-lapped and one thickness of the tape shall have a dielectric strength at least equal to the voltage of the circuit. The tape shall be self-adhesive and moisture resistant.

30 CFR §75.518

Electric equipment and circuits; overload and short circuit protection.

Automatic circuit-breaking devices or fuses of the correct type and capacity shall be installed so as to protect all electric equipment and circuits against short circuit and overloads. Three-phase motors on all electric equipment shall be provided with overload protection that will de-energize all three phases in the event that any phase is overloaded.

30 CFR §75.518-1

Electric equipment and circuits; overload and short circuit protection; minimum requirements.

A device to provide either short circuit protection or protection against overload which does not conform to the provisions of the National Electric Code, 1968, does not meet the requirement of §75.518. In addition, such devices on electric face equipment and trailing cables that are required to be permissible must meet the requirements of the applicable schedules of the Bureau of Mines.

30 CFR §75.518-2

Incandescent lamps, overload and short circuit protection.

Incandescent lamps installed along haulageways and at other locations, not contacting

combustible material, and powered from trolley or direct current feeder circuits, need not be provided with separate short circuit or overload protection, if the lamp is not more than 8 feet in distance from such circuits.

30 CFR §75.519

Main power circuits; disconnecting switches.

In all main power circuits, disconnecting switches shall be installed underground within 500 feet of the bottoms of shafts and boreholes through which main power circuits enter the underground area of the mine and within 500 feet of all other places where main power circuits enter the underground area of the mine.

30 CFR §75.519-1

Main power circuits; disconnecting switches; locations.

Section 75.519 requires (a) that a disconnecting switch be installed on the surface at a point within 500 feet of the place where the main power circuit enters the underground area of a mine, and (b) that, in an instance on which a main power circuit enters the underground area through a shaft or borehole, a disconnecting switch be installed underground within 500 feet of the bottom of the shaft or borehole.

30 CFR §75.520

Electric equipment; switches.

All electric equipment shall be provided with switches or other controls that are safely designed, constructed, and installed.

30 CFR §75.521

Lightning arresters; ungrounded and exposed power conductors and telephone wires.

Each ungrounded, exposed power conductor and each ungrounded, exposed telephone wire that leads underground shall be equipped with suitable lightning arresters of approved type within 100 feet of the point where the circuit enters the mine. Lightning arresters shall be connected to a low resistance grounding medium on the surface which shall be separated from neutral grounds by a distance of not less than 25 feet.

[38 FR 4975, Feb. 23, 1973]

30 CFR §75.522

Lighting devices.

No device for the purpose of lighting any coal mine which has not been approved by the

Secretary or his authorized representative shall be permitted in such mine.

30 CFR §75.522-1

Incandescent and fluorescent lamps.

(a) Except for areas of a coal mine inby the last open crosscut, incandescent lamps may be used to illuminate underground areas. When incandescent lamps are used in a track entry or belt entry or near track entries to illuminate special areas other than structures, the lamps shall be installed in weather-proof sockets located in positions such that the lamps will not come in contact with any combustible material. Lamps used in all other places must be of substantial construction and be fitted with a glass enclosure.

(b) Incandescent lamps within glass enclosures or fluorescent lamps may be used inside underground structures (except magazines used for the storage of explosives and detonators). In underground structures lighting circuits shall consist of cables installed on insulators or insulated wires installed in metallic conduit or metallic armor.

30 CFR §75.523

Electric face equipment; de-energization.

An authorized representative of the Secretary may require in any mine that electric face equipment be provided with devices that will permit the equipment to be de-energized quickly in the event of an emergency.

30 CFR §75.523-1

De-energization of self-propelled electric face equipment installation requirements.

(a) Except as provided in paragraphs (b) and (c) of this section, all self-propelled electric face equipment which is used in the active workings of each underground coal mine on and after March 1, 1973, shall, in accordance with the schedule of time specified in paragraphs (a)(1) and (2) of this section, be provided with a device that will quickly de-energize the tramming motors of the equipment in the event of an emergency. The requirements of this paragraph (a) shall be met as follows:

(1) On and after December 15, 1974, for self-propelled cutting machines, shuttle cars, battery-powered machines, and roof drills and bolters;

(2) On and after February 15, 1975, for all other types of self-propelled electric face equipment.

(b) Self-propelled electric face equipment that is equipped with a substantially constructed cab which meets the requirements of this part, shall not be required to be provided with a device that will quickly de-energize the tramming motors of the equipment in the event of an emergency.

(c) An operator may apply to the Director of Technical Support, Mine Safety and Health Administration, Department of Labor, 201 12th Street South, Arlington, VA 22202-5452; 202-693-9440; for approval of the installation of devices to be used in lieu of devices that will quickly de-energize the tramming motors of self-propelled electric face equipment in the event of an emergency. The Director of Technical Support may approve such devices if he determines that the performance thereof will be no less effective than the performance requirements specified in §75.523-2.

[38 FR 3407, Feb. 6, 1973, as amended at 39 FR 27557, July 30, 1974; 43 FR 12320, Mar. 24, 1978; 47 FR 28096, June 29, 1982; 67 FR 38386, June 4, 2002; 80 FR 52992, Sept. 2, 2015]

30 CFR §75.523-2

De-energization of self-propelled electric face equipment; performance requirements.

(a) De-energization of the tramming motors of self-propelled electric face equipment, required by paragraph (a) of §75.523-1, shall be provided by:

(1) Mechanical actuation of an existing pushbutton emergency stopswitch,

(2) Mechanical actuation of an existing lever emergency stopswitch, or

(3) The addition of a separate electromechanical switch assembly.

(b) The existing emergency stopswitch or additional switch assembly shall be actuated by a bar or lever which shall extend a sufficient distance in each direction to permit quick de-energization of the tramming motors of self-propelled electric face equipment from all locations from which the equipment can be operated.

(c) Movement of not more than 2 inches of the actuating bar or lever resulting from the application of not more than 15 pounds of force upon contact with any portion of the equipment operator's body at any point along the length of the actuating bar or lever shall cause de-energization of the tramming motors of the self-propelled electric face equipment.

[38 FR 3406, Feb. 6, 1973; 38 FR 4394, Feb. 14, 1973]

30 CFR §75.523-3

Automatic emergency-parking brakes.

(a) Except for personnel carriers, rubber-tired, self-propelled electric haulage equipment used in the active workings of underground coal mines shall be equipped with automatic emergency-parking brakes in accordance with the following schedule.

(1) On and after May 23, 1989—

(i) All new equipment ordered; and

(ii) All equipment originally furnished with or retrofitted with automatic emergency-parking brakes which meet the requirements of this section.

(2) On and after May 23, 1991, all other equipment.

(b) Automatic emergency-parking brakes shall--

(1) Be activated immediately by the emergency de-energization device required by 30 CFR 75.523-1 and 75.523-2;

(2) Engage automatically within 5.0 seconds when the equipment is de-energized;

(3) Safely bring the equipment when fully loaded to a complete stop on the maximum grade on which it is operated;

(4) Hold the equipment stationary despite any contraction of brake parts, exhaustion of any non-mechanical source of energy, or leakage; and

(5) Release only by a manual control that does not operate any other equipment function.

(c) Automatic emergency-parking brakes shall include a means in the equipment operator's compartment to--

(1) Apply the brakes manually without de-energizing the equipment; and

(2) Release and reengage the brakes without energizing the equipment.

(d) On and after November 24, 1989, rubber-tired, self-propelled electric face equipment not covered by paragraph (a) of this section shall be equipped with a means incorporated on the equipment and operable from each tramming station to hold the equipment stationary--

(1) On the maximum grade on which it is operated; and

(2) Despite any contraction of components, exhaustion of any non-mechanical source of energy, or leakage.

(e) The brake systems required by paragraphs (a) or (d) of this section shall be applied when the equipment operator is not at the controls of the equipment, except during movement of disabled equipment.

[54 FR 12412, Mar. 24, 1989]

30 CFR §75.524

Electric face equipment; electric equipment used in return air outby the last open crosscut; maximum level of alternating or direct electric current between frames of equipment.

The maximum level of alternating or direct electric current that exists between the frames of any two units of electric face equipment that come in contact with each other in the working places of a coal mine, or between the frames of any two units of electric equipment that come in contact with each other in return air outby the last open crosscut, shall not exceed one ampere as determined from the voltage measured across a 0.1 ohm resistor connected between the frames of such equipment.

[38 FR 29998, Oct. 31, 1973]

Subpart G – Trailing Cables

30 CFR §75.600

Trailing cables; flame resistance.

Trailing cables used in coal mines shall meet the requirements established by the Secretary for flame-resistant cables

30 CFR §75.600-1

Approved cables; flame resistance.

Cables shall be accepted or approved by MSHA as flame resistant.

[57 FR 61223, Dec. 23, 1992]

30 CFR §75.601

Short circuit protection of trailing cables.

Short circuit protection for trailing cables shall be provided by an automatic circuit breaker or other no less effective device approved by the Secretary of adequate current-interrupting capacity in each ungrounded conductor. Disconnecting devices used to disconnect power from trailing cables shall be plainly marked and identified and such devices shall be equipped or designed in such a manner that it can be determined by visual observation that the power is disconnected

30 CFR §75.601-1

Short circuit protection; ratings and settings of circuit breakers.

Circuit breakers providing short circuit protection for trailing cables shall be set so as not to exceed the maximum allowable instantaneous settings specified in this section; however, higher settings may be permitted by an authorized representative of the Secretary when he has determined that special applications are justified:

Conductor size AWG or MGM	Maximum allowable circuit breaker instantaneous setting (amperes)
14	50
12	75
10	150
8	200
6	300
4	500
3	600
2	800
1	1,000
1/0	1,250
2/0	1,500
3/0	2,000
4/0	2,500
250	2,500
300	2,500
350	2,500
400	2,500
450	2,500
500	2,500

30 CFR §75.601-2

Short circuit protection; use of fuses; approval by the Secretary.

Fuses shall not be employed to provide short circuit protection for trailing cables unless specifically approved by the Secretary

30 CFR §75.601-3

Short circuit protection; dual element fuses; current ratings; maximum values.

Dual element fuses having adequate current-interrupting capacity shall meet the requirements for short circuit protection of trailing cables as provided in §75.601, however, the current ratings of such devices shall not exceed the maximum values specified in this section:

Conductor size (AWG or MGM)	Single conductor cable		Two conductor cable	
	Ampacity	Max. fuse rating	Ampacity	Max. fuse rating
14			15	15
12			20	20
10			25	25
8	60	60	50	50
6	85	90	65	70
4	110	110	90	90
3	130	150	105	110
2	150	150	120	125
1	170	175	140	150
1/0	200	200	170	175
2/0	235	250	195	200
3/0	275	300	225	225
4/0	315	350	260	300
250	350	350	285	300
300	395	400	310	350
350	445	450	335	350
400	480	500	360	400
450	515	600	385	400
500	545	600	415	450

30 CFR §75.602

Trailing cable junctions.

When two or more trailing cables junction to the same distribution center, means shall be provided to assure against connecting a trailing cable to the wrong size circuit breaker.

30 CFR §75.603

Temporary splice of trailing cable.

One temporary splice may be made in any trailing cable. Such trailing cable may only be used for the next 24-hour period. No temporary splice shall be made in a trailing cable within 25 feet of the machine, except cable reel equipment. Temporary splices in trailing cables shall be made in a workmanlike manner and shall be mechanically strong and well insulated. Trailing cables or hand cables which have exposed wires or which have splices that heat or spark under load shall not be used. As used in this section, the term "splice" means the mechanical joining of one or more conductors that have been severed.

30 CFR §75.604

Permanent splicing of trailing cables.

When permanent splices in trailing cables are made, they shall be:

(a) Mechanically strong with adequate electrical conductivity and flexibility;

(b) Effectively insulated and sealed so as to exclude moisture; and

(c) Vulcanized or otherwise treated with suitable materials to provide flame-resistant qualities and good bonding to the outer jacket.

(d) Made using splice kits accepted or approved by MSHA as flame resistant.

[57 FR 61223, Dec. 23, 1992]

30 CFR §75.605

Clamping of trailing cables to equipment.

Trailing cables shall be clamped to machines in a manner to protect the cables from damage and to prevent strain on the electrical connections.

30 CFR §75.606

Protection of trailing cables.

Trailing cables shall be adequately protected to prevent damage by mobile equipment.

30 CFR §75.607

Breaking trailing cable and power cable connections.

Trailing cable and power cable connections to junction boxes shall not be made or broken under load.

Subpart H--Grounding

30 CFR §75.700

Grounding metallic sheaths, armors, and conduits enclosing power conductors. All metallic sheaths, armors, and conduits enclosing power conductors shall be electrically continuous throughout and shall be grounded by methods approved by an authorized representative of the Secretary.

30 CFR §75.700-1

Approved methods of grounding.

Metallic sheaths, armors and conduits in resistance grounded systems where the enclosed conductors are a part of the system will be approved if a solid connection is made to the neutral conductor; in all other systems, the following methods of grounding will be approved:

(a) A solid connection to a borehole casing having low resistance to earth;

(b) A solid connection to metal waterlines having low resistance to earth;

(c) A solid connection to a grounding conductor, other than the neutral conductor of a resistance grounded system, extending to a low resistance ground field located on the

surface;

(d) Any other method of grounding, approved by an authorized representative of the Secretary, which ensures that there is no difference in potential between such metallic enclosures and the earth.

30 CFR §75.701

Grounding metallic frames, casings, and other enclosures of electric equipment.

Metallic frames, casings, and other enclosures of electric equipment that can become "alive" through failure of insulation or by contact with energized parts shall be grounded by methods approved by an authorized representative of the Secretary.

30 CFR §75.701-1

Approved methods of grounding of equipment receiving power from ungrounded alternating current power systems.

For purposes of grounding metallic frames, casings and other enclosures of equipment receiving power from ungrounded alternating current power systems, the following methods of grounding will be approved:

(a) A solid connection between the metallic frame, casing, or other metal enclosure and the grounded metallic sheath, armor, or conduit enclosing the power conductor feeding the electrical equipment enclosed;

(b) A solid connection to a borehole casing having low resistance to earth;

(c) A solid connection to metal waterlines having low resistance to earth;

(d) A solid connection to a grounding conductor extending to a low resistance ground field located on the surface;

(e) Any other method of grounding, approved by an authorized representative of the Secretary, which ensures that there is no difference in potential between such metal enclosures and the earth.

30 CFR §75.701-2

Approved method of grounding metallic frames, casings and other enclosures receiving power from single-phase 110-220-volt circuit.

In instances where single-phase 110-220-volt circuits are used to feed electrical equipment, the only method of grounding that will be approved is the connection of all metallic frames, casings and other enclosures of such equipment to a separate grounding conductor which establishes a continuous connection to a grounded center tap of the transformer.

30 CFR §75.701-3

Approved methods of grounding metallic frames, casings and other enclosures of electric equipment receiving power from direct current power systems with one polarity grounded.

For the purpose of grounding metallic frames, casings and enclosures of any electric equipment or device-receiving power from a direct-current power system with one polarity grounded, the following methods of grounding will be approved:

(a) A solid connection to the mine track;

(b) A solid connection to the grounded power conductor of the system;

(c) Silicon diode grounding; however, this method shall be employed only when such devices are installed in accordance with the requirements set forth in paragraph (d) of §75.703-3; and

(d) Any other method, approved by an authorized representative of the Secretary, which insures that there is no difference in potential between such metal enclosures and the earth.

30 CFR §75.701-4

Grounding wires; capacity of wires.

Where grounding wires are used to ground metallic sheaths, armors, conduits, frames, casings, and other metallic enclosures, such grounding wires will be approved if:

(a) The cross-sectional area (size) of the grounding wire is at least one-half the cross-sectional area (size) of the power conductor where the power conductor used is No. 6 A.W.G., or larger.

(b) Where the power conductor used is less than No. 6 A.W.G., the cross-sectional area (size) of the grounding wire is equal to the cross-sectional area (size) of the power conductor.

30 CFR §75.701-5

Use of grounding connectors.

The attachment of grounding wires to a mine track or other grounded power conductor will be approved if separate clamps, suitable for such purpose, are used and installed to provide a solid connection

30 CFR §75.702

Protection other than grounding.

Methods other than grounding which provide no less effective protection may be permitted by the Secretary or his authorized representative.

30 CFR §75.702-1

Protection other than grounding; approved by an authorized representative of the Secretary.

Under this subpart no method other than grounding may be used to ensure against a difference in potential between metallic sheaths, armors and conduits, enclosing power conductors and frames, casings and metal enclosures of electric equipment, and the earth, unless approved by an authorized representative of the Secretary.

30 CFR §75.703

Grounding offtrack direct-current machines and the enclosures of related detached components.

The frames of all offtrack direct-current machines and the enclosures of related detached components shall be effectively grounded, or otherwise maintained at no less safe voltages, by methods approved by an authorized representative of the Secretary.

30 CFR §75.703-1

Approved method of grounding.

In instances where the metal frames both of an offtrack direct-current machine and of the metal frames of its component parts are grounded to the same grounding medium the requirements of §75.703 will be met.

30 CFR §75.703-2

Approved grounding mediums.

For purposes of grounding offtrack direct-current machines, the following grounding mediums are approved:

(a) The grounded polarity of the direct-current power system feeding such machines; or,

(b) The alternating current grounding medium where such machines are fed by an ungrounded direct-current power system originating in a portable rectifier receiving its power from a section power center. However, when such a medium is used, a separate grounding conductor must be employed.

30 CFR §75.703-3

Approved methods of grounding offtrack mobile, portable and stationary direct-current machines.

In grounding offtrack direct-current machines and the enclosures of their component parts, the following methods of grounding will meet the requirements of §75.703:

(a) The use of a separate grounding conductor located within the trailing cable of mobile and portable equipment and connected between such equipment and the direct-current grounding medium;

(b) The use of a separate ground conductor located within the direct-current power cable feeding stationary equipment and connected between such stationary equipment and the direct-current grounding medium;

(c) The use of a separate external ground conductor connected between stationary equipment and the direct-current grounding medium; or,

(d) The use of silicon diodes; however, the installation of such devices shall meet the following minimum requirements:

(1) Installation of silicon diodes shall be restricted to electric equipment receiving power from a direct-current system with one polarity grounded;

(2) Where such diodes are used on circuits having a nominal voltage rating of 250, they must have a forward current rating of 400 amperes or more, and have a peak inverse voltage rating of 400 or more;

(3) Where such diodes are used on circuits having a nominal voltage rating of 550, they must have a forward current rating of 250 amperes or more, and have a peak inverse voltage rating of 800 or more;

(4) Where fuses approved by the Secretary are used at the outby end of a trailing cable connected to electrical equipment employing silicon diodes, the rating of such fuses must not exceed 150 percent of the nominal current rating of the grounding diodes;

(5) Where circuit breakers are used at the outby end of a trailing cable connected to electrical equipment employing silicon diodes, the instantaneous trip setting shall not exceed 300 percent of the nominal current rating of the grounding diode;

(6) Overcurrent devices must be used and installed in such a manner that the operating coil circuit of the main contactor will open when a fault current with a value of 25 percent or less of the diode rating flows through the diode;

(7) The silicon diode installed must be suitable to the grounded polarity of the power system in which it is used and its threaded base must be solidly connected to the

machine frame on which it is installed;

(8) In addition to the grounding diode, a polarizing diode must be installed in the machine control circuit to prevent operation of the machine when the polarity of a trailing cable is reversed;

(9) When installed on permissible equipment, all grounding diodes, overcurrent devices, and polarizing diodes must be placed in explosion proof compartments;

(10) When grounding diodes are installed on a continuous miner, their nominal diode current rating must be at least 750 amperes or more; and,

(11) All grounding diodes shall be tested, examined and maintained as electrical equipment in accordance with the provisions of §75.512.

30 CFR §75.703-4

Other methods of protecting offtrack direct-current equipment; approved by an authorized representative of the Secretary.

Other methods of maintaining safe voltage by preventing a difference between the frames of offtract direct-current machines and the earth must be approved by an authorized representative of the Secretary.

30 CFR §75.704

Grounding frames of stationary high-voltage equipment receiving power from ungrounded delta systems.

The frames of all stationary high-voltage equipment receiving power from ungrounded delta systems shall be grounded by methods approved by an authorized representative of the Secretary.

30 CFR §75.704-1

Approved methods of grounding.

The methods of grounding stated in §75.701-1 will also be approved with respect to the grounding of frames of high-voltage equipment referred to in §75.704.

30 CFR §75.705

Work on high-voltage lines; de-energizing and grounding.

High-voltage lines, both on the surface and underground, shall be de-energized and grounded before work is performed on them, except that repairs may be permitted, in the case of energized surface high-voltage lines, if such repairs are made by a qualified person in accordance with procedures and safeguards, including, but not limited to, a

requirement that the operator of such mine provide, test, and maintain protective devices in making such repairs, to be prescribed by the Secretary prior to March 30, 1970.

30 CFR §75.705-1

Work on high-voltage lines.

(a) Section 75.705 specifically prohibits work on energized high-voltage lines underground;

(b) No high-voltage line, either on the surface or underground, shall be regarded as de-energized for the purpose of performing work on it, until it has been determined by a qualified person (as provided in §75.153) that such high-voltage line has been de-energized and grounded. Such qualified person shall by visual observation (1) determine that the disconnecting devices on the high-voltage circuit are in open position and (2) ensure that each ungrounded conductor of the high-voltage circuit upon which work is to be done is properly connected to the system-grounding medium. In the case of resistance grounded or solid wye-connected systems, the neutral wire is the system-grounding medium. In the case of an ungrounded power system, either the steel armor or conduit enclosing the system or a surface grounding field is a system grounding medium;

(c) No work shall be performed on any high-voltage line on the surface which is supported by any pole or structure which also supports other high-voltage lines until: (1) All lines supported on the pole or structure are de-energized and grounded in accordance with all of the provisions of this section which apply to the repair of energized surface high-voltage lines; or (2) the provisions of §§75.705-2 through 75.705-10 have been complied with, with respect to all lines, which are supported on the pole or structure.

(d) Work may be performed on energized surface high-voltage lines only in accordance with the provisions of §§75.705-2 through 75.705-10, inclusive.

30 CFR §75.705-2

Repairs to energized surface high-voltage lines.

An energized high-voltage surface line may be repaired only when

(a) The operator has determined that:

(1) Such repairs cannot be scheduled during a period when the power circuit could be properly de-energized and grounded;

(2) Such repairs will be performed on power circuits with a phase-to-phase nominal voltage no greater than 15,000 volts;

(3) Such repairs on circuits with a phase-to-phase nominal voltage of 5,000 volts or more will be performed only with the use of live line tools;

(4) Weather conditions will not interfere with such repairs or expose those persons assigned to such work to an imminent danger; and

(b) The operator has designated a person qualified under the provisions of §75.154 as the person responsible for carrying out such repairs and such person, in order to ensure protection for himself and other qualified persons assigned to perform such repairs from the hazards of such repair, has prepared and filed with the operator:

(1) A general description of the nature and location of the damage or defect to be repaired;

(2) The general plan to be followed in making such repairs;

(3) A statement that a briefing of all qualified persons assigned to make such repairs was conducted informing them of the general plan, their individual assignments, and the dangers inherent in such assignments;

(4) A list of the proper protective equipment and clothing that will be provided; and

(5) Such other information as the person designated by the operator feels necessary to describe properly the means or methods to be employed in such repairs.

30 CFR §75.705-3

Work on energized high-voltage surface lines; reporting.

Any operator designating and assigning qualified persons to perform repairs on energized high-voltage surface lines under the provisions of §75.705-2 shall maintain a record of such repairs. Such record shall contain a notation of the time, date, location, and general nature of the repairs made, together with a copy of the information filed with the operator by the qualified person designated as responsible for performing such repairs.

30 CFR §75.705-4

Simultaneous repairs.

When two or more persons are working on an energized high-voltage surface line simultaneously, and any one of them is within reach of another, such persons shall not be allowed to work on different phases or on equipment with different potentials.

30 CFR §75.705-5

Installation of protective equipment.

Before repair work on energized high-voltage surface lines is begun, protective equipment shall be used to cover all bare conductors, ground wires, guys, telephone lines, and other attachments in proximity to the area of planned repairs. Such protective equipment shall be installed from a safe position below the conductors or other apparatus being covered.

Each rubber protective device employed in the making of repairs shall have a dielectric strength of 20,000 volts, or more.

30 CFR §75.705-6

Protective clothing; use and inspection.

All persons performing work on energized high-voltage surface lines shall wear protective rubber gloves, sleeves, and climber guards if climbers are worn. Protective rubber gloves shall not be worn wrong side out or without protective leather gloves. Protective devices worn by a person assigned to perform repairs on high-voltage surface lines shall be worn continuously from the time he leaves the ground until he returns to the ground, and, if such devices are employed for extended periods, such person shall visually inspect the equipment assigned him for defects before each use and, in no case, less than twice each day.

30 CFR §75.705-7

Protective equipment; inspection.

Each person shall visually inspect protective equipment and clothing provided him in connection with work on high-voltage surface lines before using such equipment and clothing, and any equipment or clothing containing any defect or damage shall be discarded and replaced with proper protective equipment or clothing prior to the performance of any electrical work on such lines.

30 CFR §75.705-8

Protective equipment; testing and storage.

(a) All rubber protective equipment used on work on energized high-voltage surface lines shall be electrically tested by the operator in accordance with ASTM standards, Part 28, published February 1968, and such testing shall be conducted in accordance with the following schedule:

(1) Rubber gloves, once each month;

(2) Rubber sleeves, once every 3 months;

(3) Rubber blankets, once every 6 months;

(4) Insulator hoods and line hose, once a year; and

(5) Other electric protective equipment, once a year.

(b) Rubber gloves shall not be stored wrong side out. Blankets shall be rolled when not in use, and line hose and insulator hoods shall be stored in their natural position and shape.

30 CFR §75.705-9

Operating disconnecting or cutout switches.

Disconnecting or cutout switches on energized high-voltage surface lines shall be operated only with insulated sticks, fuse tongs, or pullers which are adequately insulated and maintained to protect the operator from the voltage to which he is exposed. When such switches are operated from the ground, the person operating such devices shall wear protective rubber gloves.

30 CFR §75.705-10

Tying into energized high-voltage surface circuits.

If the work of forming an additional circuit by tying into an energized high-voltage surface line is performed from the ground, any person performing such work must wear and employ all of the protective equipment and clothing required under the provisions of §§75.705-5 and 75.705-6. In addition, the insulated stick used by such person must have been designed for such purpose and must be adequately insulated and be maintained to protect such person from the voltage to which he is exposed.

30 CFR §75.705-11

Use of grounded messenger wires; ungrounded systems.

Solely for purposes of grounding ungrounded high-voltage power systems, grounded messenger wires used to suspend the cables of such systems may be used as a grounding medium.

30 CFR §75.706

De-energized underground power circuits; idle days idle shifts.

When not in use, power circuits underground shall be de-energized on idle days and idle shifts, except that rectifiers and transformers may remain energized.

Subpart I--Underground High-Voltage Distribution

30 CFR §75.800

High-voltage circuits; circuit breakers.

High-voltage circuits entering the underground area of any coal mine shall be protected by suitable circuit breakers of adequate interrupting capacity which are properly tested and maintained as prescribed by the Secretary. Such breakers shall be equipped with

devices to provide protection against under-voltage grounded phase, short circuit, and overcurrent.

30 CFR §75.800-1

Circuit breakers; location.

Circuit breakers protecting high-voltage circuits entering an underground area of any coal mine shall be located on the surface and in no case installed either underground or within a drift.

30 CFR §75.800-2

Approved circuit schemes.

The following circuit schemes will be regarded as providing the necessary protection to the circuits required by §75.800:

(a) Ground check relays may be used for undervoltage protection if the relay coils are designed to trip the circuit breaker when line voltage decreases to 40 percent to 60 percent of the nominal line voltage;

(b) Ground trip relays on resistance grounded systems will be acceptable as grounded phase protection;

(c) One circuit breaker may be used to protect two or more branch circuits, if the circuit breaker is adjusted to afford overcurrent protection for the smallest conductor.

30 CFR §75.800-3

Testing, examination and maintenance of circuit breakers; procedures.

(a) Circuit breakers and their auxiliary devices protecting underground high-voltage circuits shall be tested and examined at least once each month by a person qualified as provided in §75.153;

(b) Tests shall include: (1) Breaking continuity of the ground check conductor, where ground check monitoring is used; and

(2) Actuating at least two (2) of the auxiliary protective relays.

(c) Examination shall include visual observation of all components of the circuit breaker and its auxiliary devices, and such repairs or adjustments as are indicated by such tests and examinations shall be carried out immediately.

30 CFR §75.800-4

Testing, examination and maintenance of circuit breakers; record.

(a) Recordkeeping. The operator shall make a record of each test, examination, repair, or adjustment of all circuit breakers protecting high-voltage circuits which enter any underground area of the mine.

(b) *Record security.* These records shall be made in a secure book that is not susceptible to alteration or electronically in a computer system so as to be secure and not susceptible to alteration.

(c) *Retention and access.* These records shall be retained at a surface location at the mine for at least one year and shall be made available to authorized representatives of the Secretary, the representative of miners, and other interested persons.

30 CFR §75.801

Grounding resistors.

The grounding resistor, where required, shall be of the proper ohmic value to limit the voltage drop in the grounding circuit external to the resistor to not more than 100 volts under fault conditions. The grounding resistor shall be rated for maximum fault current continuously and insulated from ground for a voltage equal to the phase-to-phase voltage of the system.

30 CFR §75.802

Protection of high-voltage circuits extending underground.

(a) Except as provided in paragraph (b) of this section, high-voltage circuits extending underground and supplying portable, mobile, or, stationary high-voltage equipment shall contain either a direct or derived neutral which shall be grounded through a suitable resistor at the source transformers, and a grounding circuit, originating at the grounded side of the grounding resistor, shall extend along with the power conductors and serve as a grounding conductor for the frames of all high-voltage equipment supplied power from that circuit.

(b) Notwithstanding the requirements of paragraph (a) of this section, the Secretary or his authorized representative may permit ungrounded high-voltage circuits to be extended underground to feed stationary electric equipment if:

(1) Such circuits are either steel armored or installed in grounded, rigid steel conduit throughout their entire length; or,

(2) The voltage of such circuits is nominally 2,400 volts or less phase-to-phase and the cables used in such circuits are equipped with metallic shields around each power conductor, and contain one or more ground conductors having a total cross sectional area of not less than one-half the power conductor; and,

(3) Upon a finding by the Secretary or his authorized representative that the use of

the circuits described in paragraphs (b)(1) and (2) of this section does not pose a hazard to the miners.

(c) Within 100 feet of the point on the surface where high-voltage circuits enter the underground portion of the mine, disconnecting devices shall be installed and so equipped or designed in such a manner that it can be determined by visual observation that the power is disconnected, except that the Secretary or his authorized representative may permit such devices to be installed at a greater distance from such area of the mine if he determines, based on existing physical conditions, that such installation will be more accessible at a greater distance and will not pose any hazard to the miners.

[38 FR 4975, Feb. 23, 1973]

30 CFR §75.803

Fail safe ground check circuits on high-voltage resistance grounded systems.

On and after September 30, 1970, high-voltage, resistance grounded systems shall include a fail safe ground check circuit to monitor continuously the grounding circuit to assure continuity and the fail safe ground check circuit shall cause the circuit breaker to open when either the ground or pilot check wire is broken, or other no less effective device approved by the Secretary or his authorized representative to assure such continuity, except that an extension of time, not in excess of 12 months, may be permitted by the Secretary on a mine-by-mine basis if he determines that such equipment is not available

30 CFR §75.803-1

Maximum voltage ground check circuits.

The maximum voltage used for ground check circuits under §75.803 shall not exceed 96 volts.

30 CFR §75.803-2

Ground check systems not employing pilot check wires; approval by the Secretary. Ground check systems not employing pilot check wires will be approved only if it is determined that the system includes a fail safe design causing the circuit breaker to open when ground continuity is broken.

30 CFR §75.804

Underground high-voltage cables.

(a) Underground high-voltage cables used in resistance grounded systems shall be equipped with metallic shields around each power conductor with one or more ground conductors having a total cross sectional area of not less than one-half the power conductor, and with an insulated external conductor not smaller than No. 8 (A.W.G.) or

an insulated internal ground check conductor not smaller than No. 10 (A.W.G.) for the ground continuity check circuit.

(b) All such cables shall be adequate for the intended current and voltage. Splices made in such cables shall provide continuity of all components.

[38 FR 4976, Feb. 23, 1973]

30 CFR §75.805

Couplers.

Couplers that are used with medium-voltage or high-voltage power circuits shall be of the three-phase type with a full metallic shell, except that the Secretary may permit, under such guidelines as he may prescribe, no less effective couplers constructed of materials other than metal. Couplers shall be adequate for the voltage and current expected. All exposed metal on the metallic couplers shall be grounded to the ground conductor in the cable. The coupler shall be constructed so that the ground check continuity conductor shall be broken first and the ground conductors shall be broken last when the coupler is being uncoupled.

30 CFR §75.806

Connection of single-phase loads.

Single-phase loads, such as transformer primaries, shall be connected phase-to-phase.

30 CFR §75.807

Installation of high-voltage transmission cables.

All underground high-voltage transmission cables shall be installed only in regularly inspected air courses and haulageways, and shall be covered, buried, or placed so as to afford protection against damage, guarded where men regularly work or pass under them unless they are 6 1/2 feet or more above the floor or rail, securely anchored, properly insulated, and guarded at ends, and covered, insulated, or placed to prevent contact with trolley wires and other low-voltage circuits.

30 CFR §75.808

Disconnecting devices.

Disconnecting devices shall be installed at the beginning of branch lines in high-voltage circuits and equipped or designed in such a manner that it can be determined by visual observation that the circuit is de-energized when the switches are open.

30 CFR §75.809

Identification of circuit breakers and disconnecting switches.

Circuit breakers and disconnecting switches underground shall be marked for identification.

30 CFR §75.810

High-voltage trailing cables; splices.

In the case of high-voltage cables used as trailing cables, temporary splices shall not be used and all permanent splices shall be made in accordance with §75.604. Terminations and splices in all other high-voltage cables shall be made in accordance with the manufacturer's specifications.

30 CFR §75.811

High-voltage underground equipment; grounding.

Frames, supporting structures and enclosures of stationary, portable, or mobile underground high-voltage equipment and all high-voltage equipment supplying power to such equipment receiving power from resistance grounded systems shall be effectively grounded to the high-voltage ground.

30 CFR §75.812

Movement of high-voltage power centers and portable transformers; permit.

Power centers and portable transformers shall be de-energized before they are moved from one location to another, except that, when equipment powered by sources other than such centers or transformers is not available, the Secretary may permit such centers and transformers to be moved while energized, if he determines that another equivalent or greater hazard may otherwise be created, and if they are moved under the supervision of a qualified person, and if such centers and transformers are examined prior to such movement by such person and found to be grounded by methods approved by an authorized representative of the Secretary and otherwise protected from hazards to the miner. A record shall be kept of such examinations. High-voltage cables, other than trailing cables, shall not be moved or handled at any time while energized, except that, when such centers and transformers are moved while energized as permitted under this section, energized high-voltage cables attached to such centers and transformers may be moved only by a qualified person and the operator of such mine shall require that such person wear approved and tested insulated wireman's gloves.

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14706, Apr. 6, 1982; 60 FR 33719, June 29, 1995]

30 CFR §75.812-1

Qualified person.

A person who meets the requirements of §75.153 is a qualified person within the meaning of §75.812.

30 CFR §75.812-2

High-voltage power centers and transformers; record of examination.

The operator shall maintain a record of all examinations conducted in accordance with §75.812. Such record shall be kept in a book approved by the Secretary.

30 CFR §75.813

High-voltage longwalls; scope.

Sections 75.814 through 75.822 of this part are electrical safety standards that apply to high-voltage longwall circuits and equipment. All other existing standards in 30 CFR must also apply to these longwall circuits and equipment where appropriate.

30 CFR §75.814

Electrical protection.

(a) High-voltage circuits must be protected against short circuits, overloads, ground faults, and undervoltages by circuit-interrupting devices of adequate interrupting capacity as follows:

(1) Current settings of short-circuit protective devices must not exceed the setting specified in approval documentation, or seventy-five percent of the minimum available phase-to-phase short-circuit current, whichever is less.

(2) Time-delay settings of short-circuit protective devices used to protect any cable extending from the section power center to a motor-starter enclosure must not exceed the settings specified in approval documentation, or 0.25-second, whichever is less. Time delay settings of short-circuit protective devices used to protect motor and shearer circuits must not exceed the settings specified in approval documentation, or 3 cycles, whichever is less.

(3) Ground-fault currents must be limited by a neutral grounding resistor to not more than—

(i) 6.5 amperes when the nominal voltage of the power circuit is 2,400 volts or less; or

(ii) 3.75 amperes when the nominal voltage of the power circuit exceeds 2,400 volts.

(4) High-voltage circuits extending from the section power center must be provided with—

(i) Ground-fault protection set to cause de-energization at not more than 40 percent of the current rating of the neutral grounding resistor;

(ii) A backup ground-fault detection device to cause de-energization when a ground fault occurs with the neutral grounding resistor open; and

(iii) Thermal protection for the grounding resistor that will de-energize the longwall power center if the resistor is subjected to a sustained ground fault. The thermal protection must operate at either 50 percent of the maximum temperature rise of the grounding resistor, or 150 °C (302 °F), whichever is less, and must open the ground-wire monitor circuit for the high-voltage circuit supplying the section power center. The thermal protection must not be dependent upon control power and may consist of a current transformer and overcurrent relay.

(5) High-voltage motor and shearer circuits must be provided with instantaneous ground-fault protection set at not more than 0.125-ampere.

(6) Time-delay settings of ground-fault protective devices used to provide coordination with the instantaneous ground-fault protection of motor and shearer circuits must not exceed 0.25-second.

(7) Undervoltage protection must be provided by a device which operates on loss of voltage to cause and maintain the interruption of power to a circuit to prevent automatic restarting of the equipment.

(b) Current transformers used for the ground-fault protection specified in paragraphs (a)(4)(i) and (5) of this section must be single window-type and must be installed to encircle all three phase conductors. Equipment safety grounding conductors must not pass through or be connected in series with ground-fault current transformers.

(c) Each ground-fault current device specified in paragraphs (a)(4)(i) and (5) of this section must be provided with a test circuit that will inject a primary current of 50 percent or less of the current rating of the grounding resistor through the current transformer and cause each corresponding circuit-interrupting device to open.

(d) Circuit-interrupting devices must not reclose automatically.

(e) Where two or more high-voltage cables are used to supply power to a common bus in a high-voltage enclosure, each cable must be provided with ground-wire monitoring. The ground-wire monitoring circuits must cause de-energization of each cable when either the ground-monitor or grounding conductor(s) of any cable become severed or open. On or after May 10, 2002, parallel connected cables on newly installed longwalls must be protected as follows:

(1) When one circuit-interrupting device is used to protect parallel connected cables, the circuit-interrupting device must be electrically interlocked with the cables so that the device will open when any cable is disconnected; or

(2) When two or more parallel circuit-interrupting devices are used to protect parallel connected cables, the circuit-interrupting devices must be mechanically and electrically interlocked. Mechanical interlocking must cause all devices to open simultaneously and electrical interlocking must cause all devices to open when any cable is disconnected.

30 CFR §75.815

Disconnect devices.

(a) The section power center must be equipped with a main disconnecting device installed to de-energize all cables extending to longwall equipment when the device is in the "open" position. See Figures I-1 and I-2 in Appendix A to this subpart I.

(b**)** Disconnecting devices for motor-starter enclosures must be maintained in accordance with the approval requirements of paragraph (f) of § 18.53 of part 18 of this chapter. The compartment for the disconnect device must be provided with a caution label to warn miners against entering the compartment before de-energizing the incoming high-voltage circuits to the compartment.

(c) Disconnecting devices must be rated for the maximum phase-to-phase voltage of the circuit in which they are installed, and for the full-load current of the circuit that is supplied power through the device.

(d) Each disconnecting device must be designed and installed so that -

(1) Visual observation determines that the contacts are open without removing any cover;

(2) All load power conductors can be grounded when the device is in the "open" position; and

(3) The device can be locked in the "open" position.

(e) Disconnecting devices, except those installed in explosion-proof enclosures, must be capable of interrupting the full-load current of the circuit or designed and installed to cause the current to be interrupted automatically prior to the opening of the contacts of the device. Disconnecting devices installed in explosion-proof enclosures must be maintained in accordance with the approval requirements of paragraph (f)(2)(iv) of § 18.53 of part 18 of this chapter.

30 CFR §75.816

Guarding of cables.

(a) High-voltage cables must be guarded at the following locations:

(1) Where persons regularly work or travel over or under the cables.

(2) Where the cables leave cable handling or support systems to extend to electric components.

(b) Guarding must minimize the possibility of miners contacting the cables and protect the cables from damage. The guarding must be made of grounded metal or nonconductive flame-resistant material.

30 CFR §75.817

Cable handling and support systems.

Longwall mining equipment must be provided with cable-handling and support systems that are constructed, installed and maintained to minimize the possibility of miners contacting the cables and to protect the high-voltage cables from damage.

30 CFR §75.818

Use of insulated cable handling equipment.

(a) Energized high-voltage cables must not be handled except when motor or shearer cables need to be trained. When cables need to be trained, high-voltage insulated gloves, mitts, hooks, tongs, slings, aprons, or other personal protective equipment capable of providing protection against shock hazard must be used to prevent direct contact with the cable.

(b) High-voltage insulated gloves, sleeves, and other insulated personal protective equipment must -

(1) Have a voltage rating of at least Class 1 (7,500 volts) that meets or exceeds ASTM F496-97, “Standard Specification for In-Service Care of Insulating Gloves and Sleeves” (1997).

(2) Be examined before each use for visible signs of damage;

(3) Be removed from the underground area of the mine or destroyed when damaged or defective; and

(4) Be electrically tested every 6 months in accordance with publication ASTM F496-97. ASTM F496-97 (Standard Specification for In-Service Care of Insulating Gloves and Sleeves, 1997) is incorporated by reference and may be inspected at any MSHA Coal Mine Safety and Health District Office, or at MSHA's Office of Standards, Regulations, and Variances, 201 12th Street South, Arlington, VA 22202-5452; 202-693-9440; and at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.* In addition, copies of the document can be purchased from the American Society for Testing and Materials, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA

19428-2959; 610-832-9500; *http://www.astm.org.* This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51.

[67 FR 11001, Mar. 11, 2002, as amended at 67 FR 38386, June 4, 2002; 71 FR 16668, Apr. 3, 2006; 80 FR 52992, Sept. 2, 2015]

30 CFR §75.819

Motor-starter enclosures; barriers and interlocks.

Compartment separation and cover interlock switches for motor- starter enclosures must be maintained in accordance with the approval requirements of paragraphs (a) and (b) of Sec. 18.53 of part 18 of this chapter.

30 CFR §75.820

Electrical work; troubleshooting and testing.

(a) Electrical work on all circuits and equipment associated with high-voltage longwalls must be performed only by persons qualified under §75.153 to perform electrical work on all circuits and equipment.

(b) Prior to performing electrical work, except for troubleshooting and testing of energized circuits and equipment as provided for in paragraph (d) of this section, a qualified person must do the following:

(1) De-energize the circuit or equipment with a circuit-interrupting device.

(2) Open the circuit disconnecting device. On high-voltage circuits, ground the power conductors until work on the circuit is completed.

(3) Lock out the disconnecting device with a padlock. When more than one qualified person is performing work, each person must install an individual padlock.

(4) Tag the disconnecting device to identify each person working and the circuit or equipment on which work is being performed.

(c) Each padlock and tag must be removed only by the person who installed them, except that, if that person is unavailable at the mine, the lock and tag may be removed by a person authorized by the operator, provided -

(1) The authorized person is qualified under paragraph (a) of this section; and

(2) The operator ensures that the person who installed the lock and tag is aware of the removal before that person resumes work on the affected circuit or equipment.

(d) Troubleshooting and testing of energized circuits must be performed only -

(1) On low- and medium-voltage circuits;

(2) When the purpose of troubleshooting and testing is to determine voltages and currents; and

(3) By persons qualified to perform electrical work and who wear protective gloves on circuits that exceed 40 volts in accordance with the following table:

Circuit voltage	Type of glove required
Greater than 120 volts (nominal) (not intrinsically safe)	Rubber insulating gloves with leather protectors.
40 volts to 120 volts (nominal) (both intrinsically safe and non-intrinsically safe)	Either rubber insulating gloves with leather protectors or dry work gloves.
Greater than 120 volts (nominal) (intrinsically safe)	Either rubber insulating gloves with leather protectors or dry work gloves.

(4) Rubber insulating gloves must be rated at least for the nominal voltage of the circuit when the voltage of the circuit exceeds 120 volts nominal and is not intrinsically safe.

(e) Before troubleshooting and testing a low- or medium-voltage circuit contained in a compartment with a high-voltage circuit, the high-voltage circuit must be de-energized, disconnected, grounded, locked out and tagged in accordance with paragraph (b) of this section.

(f) Prior to the installation or removal of conveyor belt structure, high-voltage cables extending from the section power center to longwall equipment and located in the belt entries must be:

(1) De-energized; or

(2) Guarded in accordance with §75.816 of this part, at the location where the belt structure is being installed or removed; or

(3) Located at least 6.5 feet above the mine floor.

30 CFR §75.821

Testing, examination and maintenance.

(a) At least once every 7 days, a person qualified in accordance with Sec. 75.153 to perform electrical work on all circuits and equipment must test and examine each unit of high-voltage longwall equipment and circuits to determine that electrical protection, equipment grounding, permissibility, cable insulation, and control devices are being properly maintained to prevent fire, electrical shock, ignition, or operational hazards from existing on the equipment. Tests must include activating the ground-fault test circuit as required by Sec. 75.814(c).

(b) Each ground-wire monitor and associated circuits must be examined and tested at least once each 30 days to verify proper operation and that it will cause the corresponding circuit-interrupting device to open.

(c) When examinations or tests of equipment reveal a fire, electrical shock, ignition, or operational hazard, the equipment must be removed from service immediately or repaired immediately.

(d) At the completion of examinations and tests required by this section, the person who makes the examinations and tests must certify by signature and date that they have been conducted. A record must be made of any unsafe condition found and any corrective action taken. Certifications and records must be kept for at least one year and must be made available for inspection by authorized representatives of the Secretary and representatives of miners.

30 CFR §75.822

Underground high-voltage longwall cables.

In addition to the high-voltage cable design specifications in §75.804 of this part, high-voltage cables for use on longwalls may be a type SHD cable with a center ground-check conductor no smaller than a No. 16 AWG stranded conductor. The cables must be MSHA accepted as flame-resistant under part 18 or approved under subpart K of part 7.

30 CFR §75.824

Electrical protection.

(a) *Trailing cable protection.* The trailing cable extending to the high-voltage continuous mining machine must be protected by a circuit-interrupting device of adequate interrupting capacity and voltage that provides short-circuit, overload, ground-fault, and under-voltage protection as follows:

(1) *Short-circuit protection.*

(i) The current setting of the device must be the setting specified in the approval documentation or 75 percent of the minimum available phase-to-phase short-circuit current, whichever is less; and

(ii) The time-delay setting must not exceed 0.050 seconds.

(2) *Ground-fault protection.*

(i) Neutral grounding resistors must limit the ground-fault current to no more than 0.5 ampere.

(ii) Ground-fault devices must cause de-energization of the circuit extending to the continuous mining machine at not more than 0.125 ampere. The time-delay of the device must not exceed 0.050 seconds.

(iii) Look-ahead circuits must detect a ground-fault condition and prevent the circuit-interrupting device from closing as long as the ground-fault condition exists.

(iv) Backup ground-fault devices must cause de-energization of the circuit extending to the continuous mining machine at not more than 40 percent of the voltage developed across the neutral grounding resistor when a ground fault occurs with the neutral grounding resistor open. The time-delay setting of the backup device must not exceed 0.25 seconds.

(v) Thermal devices must detect a sustained ground-fault current in the neutral grounding resistor and must de-energize the incoming power. The device must operate at either 50 percent of the maximum temperature rise of the neutral grounding resistor or 302 °F (150 °C), whichever is less. Thermal protection must not be dependent on control power and may consist of a current transformer and over-current relay in the neutral grounding resistor circuit.

(vi) A single window-type current transformer that encircles all three-phase conductors must be used to activate the ground-fault device protecting the continuous mining machine. Equipment grounding conductors must not pass through the current transformer.

(vii) A test circuit for the ground-fault device must be provided. The test circuit must inject no more than 50 percent of the current rating of the neutral grounding resistor through the current transformer. When the test circuit is activated, the circuit-interrupting device must open.

(3) *Under-voltage protection.* The under-voltage device must operate on a loss of voltage, de-energize the circuit, and prevent the equipment from automatically restarting.

(b) *Re-closing.* Circuit-interrupting devices must not re-close automatically.

(c) *Onboard Power Circuits.* When a grounded-phase indicator light circuit is used and it indicates a grounded-phase fault, the following corrective actions must be taken:
(1) The machine must be moved immediately to a location with a properly supported roof; and

(2) The grounded-phase condition must be located and corrected prior to placing the continuous mining machine back into operation.

[75 FR 17549, Apr. 6, 2010]

30 CFR §75.825

Power centers.

(a) *Main disconnecting switch.* The power center supplying high-voltage power to the continuous mining machine must be equipped with a main disconnecting switch that, when in the open position, de-energizes input to all power transformers.

(b) *Trailing cable disconnecting device.* In addition to the main disconnecting switch

required in paragraph (a) of this section, the power center must be equipped with a disconnecting device for each circuit that supplies power to a high-voltage continuous mining machine. A disconnecting device is defined as a disconnecting switch or a cable coupler.

(c) *Disconnecting switches.* Each disconnecting switch must be labeled to clearly identify the circuit it disconnects, and be designed and installed as follows:

(1) Rated for the maximum phase-to-phase voltage of the circuit;

(2) Rated for the full-load current of the circuit that is supplied power through the device.

(3) Allow for visual observation, without removing any covers, to verify that the contacts are open;

(4) Ground all power conductors on the load side when the switch is in the "open and grounded" position;

(5) Can only be locked out in the "open and grounded" position; and

(6) Safely interrupts the full-load current of the circuit or causes the current to be interrupted automatically before the disconnecting switch opens.

(d) *Barriers and covers.* All compartments that provide access to high-voltage circuits must have barriers and/or covers to prevent miners from contacting energized high-voltage circuits.

(e) *Main disconnecting switch and control circuit interlocking.* The control circuit must be interlocked with the main disconnecting switch in the power center so that:

(1) When the main disconnecting switch is in the "open" position, the control circuit can only be powered through an auxiliary switch in the "test" position; and

(2) When the main disconnecting switch is in the "closed" position, the control circuit can only be powered through an auxiliary switch in the "normal" position.

(f) *Interlocks.* Each cover or removable barrier providing access to high-voltage circuits must be equipped with at least two interlock switches. Except when the auxiliary switch is on the "test" position, removal of any cover or barrier that exposes energized high-voltage circuits must cause the interlock switches to automatically de-energize the incoming circuit to the power center.

(g) *Emergency stop switch.* The power center must be equipped with an externally accessible emergency stop switch hard-wired into the incoming ground-wire monitor circuit that de-energizes the incoming high-voltage in the event of an emergency.

(h) *Grounding stick.* The power center must be equipped with a grounding stick to be used

prior to performing electrical work to assure that high-voltage capacitors are discharged and circuits are de-energized. The power center must have a label readily identifying the location of the grounding stick. The grounding stick must be stored in a dry location.

(i) *Caution label.* All compartments providing access to energized high-voltage conductors and parts must display a caution label to warn miners against entering the compartments before de-energizing incoming high-voltage circuits.

[75 FR 17549, Apr. 6, 2010]

30 CFR §75.826

High-voltage trailing cables.

High-voltage trailing cables must:

(a) Meet existing trailing cable requirements and the approval requirements of the high-voltage continuous mining machine; and

(b) Meet existing ground-check conductor requirements (§75.804) or have a stranded center ground-check conductor not smaller than a No. 16 A.W.G.

[75 FR 17549, Apr. 6, 2010]

30 CFR §75.827

Guarding of trailing cables.

(a) *Guarding.* (1) The high-voltage cable must be guarded in the following locations:

(i) From the power center cable coupler for a distance of 10 feet inby the power center;

(ii) From the entrance gland for a distance of 10 feet outby the last strain clamp on the continuous mining machine; and,

(iii) At any location where the cable could be damaged by moving equipment.

(2) Guarding must be constructed using nonconductive flame-resistant material or grounded metal.

(b) *Suspended cables and cable crossovers.* When equipment must cross any portion of the cable, the cable must be either:

(1) Suspended from the mine roof; or

(2) Protected by a cable crossover having the following specifications:

(i) A minimum length of 33 inches;

(ii) A minimum width of 17 inches;

(iii) A minimum height of 3 inches;

(iv) A minimum cable placement area of two and one half-inches (2⅟2″) high by four and one-quarter inches (4⅟4″) wide;

(v) Made of nonconductive material;

(vi) Made of material with a distinctive color. The color black must not be used; and

(vii) Made of material that has a minimum compressive strength of 6,400 pounds per square inch (psi).

[75 FR 17549, Apr. 6, 2010]

30 CFR §75.828

Trailing cable pulling.

The trailing cable must be de-energized prior to being pulled by any equipment other than the continuous mining machine. The cable manufacturer's recommended pulling procedures must be followed when pulling the trailing cable with equipment other than the continuous mining machine.

[75 FR 17549, Apr. 6, 2010]

30 CFR §75.829

Tramming continuous mining machines in and out of the mine and from section to section.

(a) *Conditions of use.* Tramming the continuous mining machine in and out of the mine and from section to section must be done in accordance with movement requirements of high-voltage power centers and portable transformers (§75.812) and as follows:

(1) The power source must not be located in areas where permissible equipment is required;

(2) The continuous mining machine must not be used for mining or cutting purposes, unless a power center is used in accordance with §§75.823 through 75.828 and §§75.830 through 75.833;

(3) Low-, medium-, and high-voltage cables must comply with §§75.600-1, 75.907, and 75.826, as applicable; and

(4) The energized high-voltage cable must be mechanically secured onboard the

continuous mining machine. This provision applies only when using the power sources specified in paragraphs (c)(2) and (c)(3) of this section.

(b) *Testing prior to tramming.* Prior to tramming the continuous mining machine,

(1) A qualified person must activate the ground-fault and ground-wire monitor test circuits of the power sources specified in paragraph (c) of this section to assure that the corresponding circuit-interrupting device opens the circuit. Corrective actions and recordkeeping resulting from these tests must be in accordance with §§75.832(f) and (g).

(2) Where applicable, a person designated by the mine operator must activate the test circuit for the grounded-phase detection circuit on the continuous mining machine to assure that the detection circuit is functioning properly. Corrective actions resulting from this test must be in accordance with §75.832(f).

(c) *Power sources.* In addition to the power center specified in §75.825, the following power sources may be used to tram the continuous mining machine.

(1) *Medium-voltage power source.* A medium-voltage power source is a source that supplies 995 volts through a trailing cable (See Figure 1 of this section) to the continuous mining machine. The medium-voltage power source must—

(i) Not be used to back-feed the high-voltage circuits of the continuous mining machine; and

(ii) Meet all applicable requirements for medium-voltage circuits in 30 CFR 75.

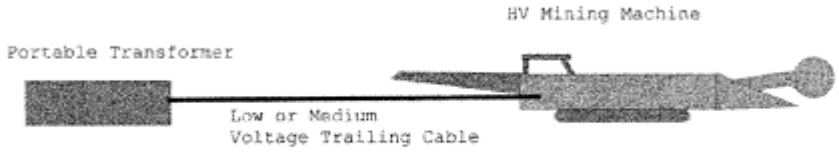

Figure 1-Power Source-75.829(c)(1) 995 volts used for tramming

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(2) *Step-up transformer.* A step-up transformer is a transformer that steps up the low or medium voltage to high-voltage (See Figure 2 in this section) and must meet the following requirements:

(i) The trailing cable supplying low or medium voltage to the step-up transformer must meet the applicable requirements of 30 CFR part 75;

(ii) The high-voltage circuit output of the step-up transformer supplying power to the continuous mining machine must meet the applicable provisions of §75.824;

(iii) The step-up transformer enclosure must be—

(A) Securely mounted to minimize vibration on:

(1) The continuous mining machine; or

(2) A sled/cart that must be connected to the continuous mining machine by a tow-bar and be in close proximity to the mining machine.

(B) Grounded as follows:

(1) Connected to the incoming ground conductor of the low- or medium-voltage trailing cable;

(2) Bonded by a No. 1/0 A.W.G. or larger external grounding conductor to the continuous mining machine frame; and

(3) Bonded by a No. 1/0 A.W.G. or larger external grounding conductor to the metallic shell of each cable coupler.

(C) Equipped with:

(1) At least two interlock switches for each of the enclosure covers; and

(2) An external emergency stop switch to remove input power to the step-up transformer.

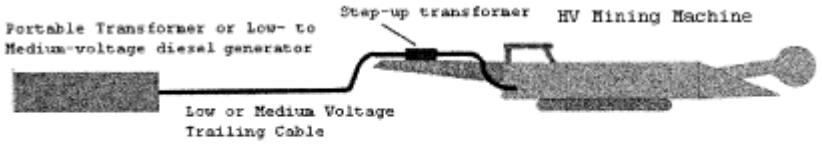


Figure 2 - Power source - 75.829(c)(2) 480 or 995 volts to a step-up transformer to 2300 volts for tramming

[75 FR 17549, Apr. 6, 2010]

30 CFR §75.830

Splicing and repair of trailing cables.

(a) *Splices and repairs.* (1) Splicing means the mechanical joining of one or more severed conductors in a single length of a cable including the replacement of: Insulation, semi-conductive tape, metallic shielding, and the outer jacket(s).

(2) Repair means to fix damage to any component of the cable other than the conductor.

(3) Splices and repairs to high-voltage trailing cables must be made:

(i) Only by a qualified person trained in the proper methods of splicing and repairing high-voltage trailing cables;

(ii) In a workman-like manner;

(iii) In accordance with §75.810; and

(iv) Using only MSHA-approved high-voltage kits that include instructions for outer-jacket repairs and splices.

(b) *Splicing limitations.* (1) Splicing of the high-voltage trailing cable within 35 feet of the continuous mining machine is prohibited.

(2) Only four (4) splices will be allowed at any one time for the portion of the trailing cable that extends from the continuous miner outby for a distance of 300 feet.

[75 FR 17549, Apr. 6, 2010]

30 CFR §75.831

Electrical work; troubleshooting and testing.

(a) *Trailing cable and continuous mining machine electrical work procedures.* Prior to performing electrical work, other than troubleshooting and testing, on the high-voltage trailing cable or the continuous mining machine, a qualified person must de-energize the power center and follow procedures specified in paragraph (1) or (2):

(1) If a trailing cable disconnecting switch is provided:

(i) Open and ground the power conductors, lock out and tag the disconnecting switch; and

(ii) Lock out and tag the plug to the power receptacle.

(2) If a trailing cable disconnecting switch is not provided and a cable coupler is used as a disconnecting device:

(i) Remove the plug from the power receptacle and connect it to the grounding receptacle;

(ii) Lock out and tag the plug to the grounding receptacle; and

(iii) Place a dust cover over the power receptacle.

(b) *Troubleshooting and testing the trailing cable.* During troubleshooting and testing, the de-energized high-voltage cable may be disconnected from the power center only for that period of time necessary to locate the defective condition. Prior to troubleshooting and testing trailing cables, a qualified person must perform the following:

(1) If a trailing cable disconnecting switch is provided:

(i) Open and ground power conductors and lock out and tag the disconnecting switch;

(ii) Disconnect the plug from the power receptacle;

(iii) Lock out and tag the plug; and

(iv) Place a dust cover over the power receptacle.

(2) If a trailing cable disconnecting switch is not provided and a cable coupler is used as a disconnecting device:

(i) Remove the plug from the power receptacle and connect it to the grounding receptacle to ground the power conductors;

(ii) Remove the plug from the grounding receptacle and install a lock and tag on the plug; and

(iii) Place a dust cover over the power receptacle.

(c) *Troubleshooting and testing limitations.* Troubleshooting and testing energized circuits must be performed only:

(1) On low- and medium-voltage circuits;

(2) When the purpose of troubleshooting and testing is to determine voltages and currents;

(3) By qualified persons; and

(4) When using protective gloves in accordance with the following table:

Circuit voltage	Type of glove required
Greater than 120 volts (nominal) (not intrinsically safe)	Rubber insulating gloves with leather protectors.
40 volts to 120 volts (nominal) (both intrinsically safe and non-intrinsically safe)	Either rubber insulating gloves with leather protectors or dry work gloves.
Greater than 120 volts (nominal) (intrinsically safe)	Either rubber insulating gloves with leather protectors or dry work gloves.

(d) *Power center electrical work procedures.* Before any work is performed inside any compartment of the power center, except for troubleshooting and testing energized circuits as specified in paragraph (c) of this section, a qualified person must:

(1) De-energize affected circuits;

(2) Open the corresponding disconnecting switch, lock it out, and tag it to assure the circuit is isolated;

(3) Visually verify that the contacts of the disconnecting switch are open and grounded; and

(4) Discharge all high-voltage capacitors and circuits.

(e) *Locking out and tagging responsibilities.* (1) When more than one qualified person is performing electrical work, including troubleshooting and testing, each person must install an individual lock and tag. Each lock and tag must be removed only by the persons who installed them.

(2) If the person who installed the lock and tag is unavailable, the lock and tag may be removed by a person authorized by the operator, provided that:

(i) The authorized person is a qualified person; and

(ii) The mine operator assures that the person who installed the lock and tag is aware that the lock and tag have been removed.

[75 FR 17549, Apr. 6, 2010]

30 CFR §75.832

Frequency of examinations; recordkeeping.

(a) *Continuous mining machine examination.* At least once every 7 days, a qualified person must examine each high-voltage continuous mining machine to verify that electrical protection, equipment grounding, permissibility, cable insulation, and control devices are properly installed and maintained.

(b) *Ground-fault test circuit.* At least once every 7 days, and prior to tramming the high-voltage continuous mining machine, a qualified person must activate the ground-fault test circuit to verify that it will cause the corresponding circuit-interrupting device to open.

(c) *Ground-wire monitor test.* At least once every 7 days, and prior to tramming the high-voltage continuous mining machine, a qualified person must examine and test each high-voltage continuous mining machine ground-wire monitor circuit to verify that it will cause the corresponding circuit-interrupting device to open.

(d) *Trailing cable inspections.* (1) Once each day during the shift that the continuous mining machine is first energized, a qualified person must de-energize and inspect the entire length of the high-voltage trailing cable from the power center to the continuous mining machine. The inspection must include examination of the outer jacket repairs and splices for damage, and assure guarding is provided where required.

(2) At the beginning of each shift that the continuous mining machine is energized, a person designated by the mine operator must de-energize and visually inspect the high-voltage trailing cable for damage to the outer jacket. This inspection must be conducted from the continuous mining machine to the following locations:

(i) The last open crosscut;

(ii) Within 150 feet of the working place during retreat or second mining; or

(iii) Up to 150 feet from the continuous mining machine when the machine is used in outby areas.

(e) *Grounded-phase detection test.* When a grounded-phase test circuit is provided on a high-voltage continuous mining machine, a person designated by the mine operator must activate the test circuit at the beginning of each production shift to assure that the detection circuit is functioning properly.

(f) *Corrective action.* When examinations or tests of equipment reveal a risk of fire, electrical shock, ignition, or operational hazard, the equipment must be immediately removed from service or repaired.

(g) *Record of tests.* (1) At the completion of examinations and tests required under paragraphs (a), (b), and (c) of this section, the person conducting the examinations and tests must:

(i) Certify by signature and date that the examinations and tests have been conducted.

(ii) Make a record of any unsafe condition found.

(2) Any corrective action(s) must be recorded by the person taking the corrective action.

(3) The record must be countersigned by the mine foreman or equivalent mine official by the end of the mine foreman's or the equivalent mine official's next regularly scheduled working shift.

(4) Records must be maintained in a secure book that is not susceptible to alteration or electronically in a computer system so as to be secure and not susceptible to alteration.

(5) Certifications and records must be kept for at least 1 year and must be made available for inspection by authorized representatives of the Secretary and representatives of miners.

[75 FR 17549, Apr. 6, 2010]

30 CFR §75.833

Handling high-voltage trailing cables.

(a) *Cable handling.* (1) Miners must not handle energized trailing cables unless they are wearing high-voltage insulating gloves, which include the rubber gloves and leather outer protector gloves, or are using insulated cable handling tools that meet the requirements of paragraph (c) or (d) of this section.

(2) Miners must not handle energized high-voltage cables with any parts of their bodies except by hand in accordance with paragraph (1) above.

(b) *Availability.* Each mine operator must make high-voltage insulating gloves or insulated

cable handling tools available to miners handling energized high-voltage trailing cables.

(c) *High-voltage insulating gloves.* High-voltage insulating gloves must meet the following requirements:

(1) The rubber gloves must be designed and maintained to have a voltage rating of at least Class 1 (7,500 volts) and tested every 30 days in accordance with publication ASTM F496-02a, "Standard Specification for In-Service Care of Insulating Gloves and Sleeves" (2002). The Director of the Federal Register approved this incorporation by reference in accordance with 5 U.S.C. 522(a) and 1 CFR part 51. ASTM F496-02a may be obtained from the American Society for Testing and Materials, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, call 610-832-9500 or go to http://www.astm.org. ASTM F496-02a is available for inspection at any MSHA Coal Mine Safety and Health District Office, at the MSHA Office of Standards, Regulations, and Variances, 201 12th Street South, Arlington, VA 22202-5452; 202-693-9440; or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal__register/code__of__federal__regulations/ibr__locations.html.

(2) The rubber glove portion must be air-tested at the beginning of each shift to assure its effectiveness.

(3) Both the leather protector and rubber insulating gloves must be visually examined before each use for signs of damage or defects.

(4) Damaged rubber gloves must be removed from the underground area of the mine or destroyed. Leather protectors must be maintained in good condition or replaced.

(d) *Insulated cable handling tools.* Insulated cable handling tools must be:

(1) Rated and properly maintained to withstand at least 7,500 volts;

(2) Designed and manufactured for cable handling;

(3) Visually examined before each use for signs of damage or defects; and

(4) Removed from the underground area of the mine or destroyed if damaged or defective.

[75 FR 17549, Apr. 6, 2010, as amended at 80 FR 52992, Sept. 2, 2015]

30 CFR §75.834

Training.

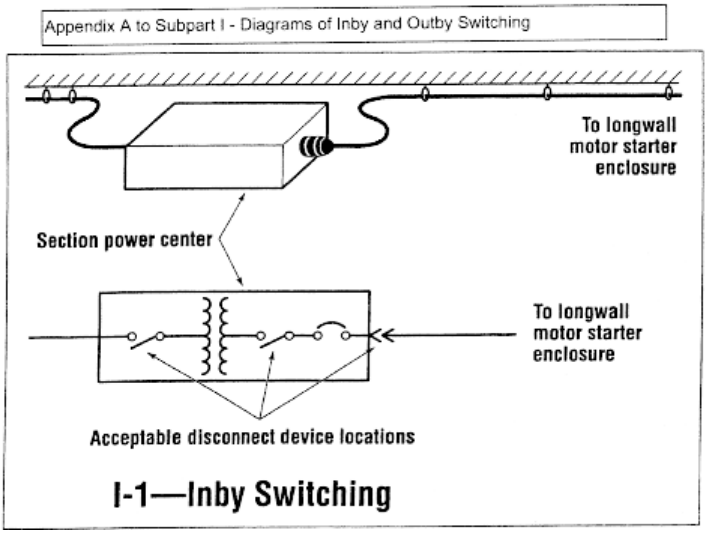
In addition to existing part 48 task training, hazard training, training for qualified persons under existing §75.153, and annual refresher training, the following specialized training

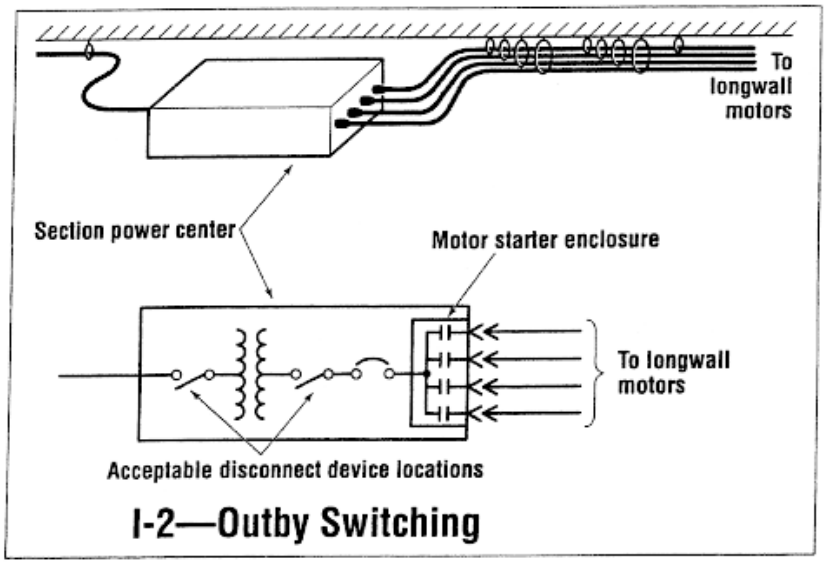
shall be provided and specified in the part 48 plan:

(a) Training for miners who perform maintenance on high-voltage continuous mining machines in high-voltage safety, testing, and repair and maintenance procedures.

(b) Training for personnel who work in the vicinity of high-voltage continuous mining machines in safety procedures and precautions for moving the high-voltage machines or the trailing cables.

Appendix A to Subpart I of Part 75—Diagrams of Inby and Outby Switching





[75 FR 17549, Apr. 6, 2010]

Subpart J – Underground Low and Medium Voltage Alternating Current Circuits

30 CFR §75.900

Low- and medium-voltage circuits serving three-phase alternating current equipment; circuit breakers.

Low- and medium-voltage power circuits serving three-phase alternating current equipment shall be protected by suitable circuit breakers of adequate interrupting capacity which are properly tested and maintained as prescribed by the Secretary. Such breakers shall be equipped with devices to provide protection against undervoltage, grounded phase, short circuit, and overcurrent.

30 CFR §75.900-1

Circuit breakers; location.

Circuit breakers used to protect low-and medium-voltage circuits underground shall be located in areas which are accessible for inspection, examination, and testing, have safe roofs, and are clear of any moving equipment used in haulageways.

30 CFR §75.900-2

Approved circuit schemes.

The following circuit schemes will be regarded as providing the necessary protection to the circuit required by §75.900:

(a) Ground check relays may be used for undervoltage protection if the relay coils are designed to trip the circuit breaker when line voltage decreases to 40 to 60 percent of the nominal line voltage.

(b) One undervoltage device installed in the main secondary circuit at the source transformer may be used to provide undervoltage protection for each circuit that receives power from that transformer.

(c) One circuit breaker may be used to protect two or more branch circuits if the circuit breaker is adjusted to afford overcurrent protection for the smallest conductor.

(d) Circuit breakers with shunt trip, series trip or undervoltage release devices may be used if the tripping elements of such devices are selected or adjusted in accordance with the settings listed in the tables of the National Electric Code, 1968.

30 CFR §75.900-3

Testing, examination, and maintenance of circuit breakers; procedures.

Circuit breakers protecting low- and medium-voltage alternating current circuits serving three-phase alternating current equipment and their auxiliary devices shall be tested and examined at least once each month by a person qualified as provided in §75.153. In performing such tests, actuating any of the circuit breaker auxiliaries or control circuits in any manner which causes the circuit breaker to open, shall be considered a proper test. All components of the circuit breaker and its auxiliary devices shall be visually examined and such repairs or adjustments as are indicated by such tests and examinations shall be carried out immediately.

30 CFR §75.900-4

Testing, examination, and maintenance of circuit breakers; record.

The operator of any coal mine shall maintain a written record of each test, examination, repair, or adjustment of all circuit breakers protecting low- and medium-voltage circuits serving three-phase alternating current equipment used in the mine. Such record shall be kept in a book approved by the Secretary.

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14706, Apr. 6, 1982; 60 FR 33719, June 29, 1995]

30 CFR §75.901

Protection of low-and medium-voltage three-phase circuits used underground.

(a) Low- and medium-voltage three-phase alternating-current circuits used underground shall contain either a direct or derived neutral which shall be grounded through a suitable resistor at the power center, and a grounding circuit, originating at the grounded side of the grounding resistor, shall extend along with the power conductors and serve as a grounding conductor for the frames of all the electrical equipment supplied power from that circuit, except that the Secretary or his authorized representative may permit ungrounded low- and medium-voltage circuits to be used underground to feed such stationary electrical equipment if such circuits are either steel armored or installed in grounded rigid steel conduit throughout their entire length. The grounding resistor, where required, shall be of the proper ohmic value to limit the ground fault current to 25 amperes. The grounding resistor shall be rated for maximum fault current continuously and insulated from ground for a voltage equal to the phase-to-phase voltage of the system.

(b) Diesel-powered electrical generators used as an alternative to power centers for the purpose of moving equipment in, out, and around the mine, and to perform work in areas where permissible equipment is not required, must comply with the following:

(1) The diesel engine powering the electrical generator must be approved under 30 CFR part 7, subpart E.

(2) A grounding resistor rated for the phase-to-phase voltage of the system must be provided to limit the ground-fault current to not more than 0.5 amperes. The grounding resistor(s) must be located:

(i) Between the wye-connected generator neutral and the generator frame; (see Figure I in Appendix A to subpart J of this part) or

(ii) Between the wye-connected generator neutral and the generator frame and between the wye-connected transformer secondary and the transformer frame when an isolation transformer(s) is used and the generator is supplying power to the other equipment; (see Figure II in Appendix A to subpart J of this part) or

(iii) Between the wye-connected generator neutral and the generator frame when an auto-transformer is used. (see Figure III in Appendix A to subpart J of this part)

(3) Each three-phase output circuit of the generator must be equipped with a sensitive ground fault relay. The protective relay must be set to cause the circuit interrupting device that supplies power to the primary windings of each transformer to trip and shut down the diesel engine when a phase-to-frame fault of not more than 90 milliamperes occurs.

(4) Each three-phase output circuit that supplies power to equipment must be equipped with an instantaneous sensitive ground-fault relay that will cause its respective circuit interrupting device(s) to trip and cause shutdown of the diesel engine when a phase-to-frame fault occurs. The grounded-phase protection must be set at not more than 90 milliamps. Current transformers used for the ground-fault protection must be single window-type and must be installed to encircle all three phase conductors. Equipment safety grounding conductors must not pass through or be connected in series with ground-fault current transformers.

(5) Each three-phase circuit interrupting device must be provided with a means to provide short-circuit, overcurrent, grounded-phase, undervoltage, and ground wire monitoring protection. The instantaneous only trip unit for the circuit interrupting device(s) in use must be adjusted to trip at not more than 75 percent of the minimum available short circuit current at the point where the portable cable enters the equipment or the maximum allowable instantaneous settings specified in §75.601-1, whichever is less.

(6) The equipment portable cable length(s) must not exceed the length(s) specified in 30 CFR part 18, appendix I, table 9, Specifications for Cables Longer than 500 Feet.

(7) Permanent label(s) listing the maximum circuit interrupting device setting(s) and maximum portable cable length(s) must be installed on each instantaneous trip unit or be maintained near each three-phase circuit interrupting device. The permanent label(s) must be maintained legibly.

(8) The circuit interrupting device that supplies three-phase power circuit(s) to the equipment being powered must be limited to the use of only one circuit interrupting device at a time when equipment is being moved in, out, and around the mine.

(9) The grounding system must include an MSHA-accepted ground wire monitor system that satisfies the requirements of §75.902; or have a No. 1/0 or larger external grounding conductor to bond and ground the frames of all equipment to the frame of the generator.

(10) All trailing cables extending from the generator to equipment must comply with §75.907.

(11) A strain relief device must be provided on each end of the trailing cables that extends between the generator and the piece of equipment being powered.

(12) Prior to moving each piece of equipment or performing work, a functional test of each ground fault and ground wire monitor system must be performed by a qualified electrician who meets the requirements of §75.153. The ground-fault circuit must be tested without subjecting the circuit to an actual grounded phase condition. A record of each test must be maintained and made available to authorized representatives of the Secretary and to the miners in such mine.

[35 FR 17890, Nov. 20, 1970, as amended at 70 FR 77736, Dec. 30, 2005]

30 CFR §75.902

Low-and medium-voltage ground check monitor circuits.

On or before September 30, 1970, low- and medium-voltage resistance grounded systems shall include a fail-safe ground check circuit to monitor continuously the grounding circuit to assure continuity which ground check circuit shall cause the circuit breaker to open when either the ground or pilot check wire is broken, or other no less effective device approved by the Secretary or his authorized representative to assure such continuity, except that an extension of time, not in excess of 12 months, may be permitted by the Secretary on a mine-by-mine basis if he determines that such equipment is not available. Cable couplers shall be constructed so that the ground check continuity conductor shall be broken first and the ground conductors shall be broken last when the coupler is being uncoupled.

30 CFR §75.902-1

Maximum voltage ground check circuits.

The maximum voltage used for such ground check circuits shall not exceed 40 volts.

30 CFR §75.902-2

Approved ground check systems not employing pilot check wires.

Ground check systems not employing pilot check wires will be approved only if it is determined that the system includes a fail safe design causing the circuit breaker to open when ground continuity is broken.

30 CFR §75.902-4

Attachment of ground conductors and ground check wires to equipment frames; use of separate connections.

In grounding equipment frames of all stationary, portable or mobile equipment receiving power from resistance grounded systems separate connections shall be used when practicable.

30 CFR §75.903

Disconnecting devices.

Disconnecting devices shall be installed in conjunction with the circuit breaker to provide visual evidence that the power is disconnected.

30 CFR §75.904

Identification of circuit breakers.

Circuit breakers shall be marked for identification.

30 CFR §75.905

Connection of single-phase loads.

Single-phase loads shall be connected phase-to-phase.

30 CFR §75.906

Trailing cables for mobile equipment, ground wires, and ground check wires.

Trailing cables for mobile equipment shall contain one or more ground conductors having a cross-sectional area of not less than one-half the power conductor, and, on September 30, 1970, an insulated conductor for the ground continuity check circuit or other no less effective device approved by the Secretary or his authorized representative to assure such continuity, except that an extension of time, not in excess of 12 months may be permitted by the Secretary on a mine-by-mine basis if he determines that such equipment is not available. Splices made in the cables shall provide continuity of all components.

30 CFR §75.907

Design of trailing cables for medium-voltage circuits.

Trailing cables for medium-voltage circuits shall include grounding conductors, a ground check conductor, and grounded metallic shields around each power conductor or a ground metallic shield over the assembly, except that on equipment employing cable reels, cables without shields may be used if the insulation is rated 2,000 volts or more.

Subpart K--Trolley Wires and Trolley Feeder Wires

30 CFR §75.1000

Cutout switches.

Trolley wires and trolley feeder wires, shall be provided with cutout switches at intervals of not more than 2,000 feet and near the beginning of all branch lines.

30 CFR §75.1001

Overcurrent protection.

Trolley wires and trolley feeder wires shall be provided with overcurrent protection.

30 CFR §75.1001-1

Devices for overcurrent protection; testing and calibration requirements; records.

(a) Automatic circuit interrupting devices that will de-energize the affected circuit upon occurrence of a short circuit at any point in the system will meet the requirements of §75.1001.

(b) Automatic circuit interrupting devices described in paragraph (a) of this section shall be tested and calibrated at intervals not to exceed six months. Testing of such devices shall include passing the necessary amount of electric current through the device to cause activation. Calibration of such devices shall include adjustment of all associated relays to ±15 percent of the indicated value. An authorized representative of the Secretary may require additional testing or calibration of these devices.

(c) A record of the tests and calibrations required by paragraph (b) of this section shall be kept, and shall be made available, upon request, to an authorized representative of the Secretary.

[38 FR 29998, Oct. 31, 1973, as amended at 47 FR 14706, Apr. 6, 1982; 60 FR 33719, June 29, 1995]

30 CFR §75.1002

Installation of electric equipment and conductors; permissibility.

(a) Electric equipment must be permissible and maintained in a permissible condition when such equipment is located within 150 feet of pillar workings or longwall faces.

(b) Electric conductors and cables installed in or in by the last open crosscut or within 150 feet of pillar workings or longwall faces must be—

(1) Shielded high-voltage cables supplying power to permissible longwall equipment;

(2) Interconnecting conductors and cables of permissible longwall equipment;

(3) Conductors and cables of intrinsically safe circuits; and

(4) Cables and conductors supplying power to low- and medium-voltage permissible equipment.

(5) Shielded high-voltage cables supplying power to permissible continuous mining machines.

[67 FR 11004, Mar. 11, 2002, as amended at 75 FR 17553, Apr. 6, 2010]

30 CFR §75.1003

Insulation of trolley wires, trolley feeder wires and bare signal wires; guarding of trolley wires and trolley feeder wires.

Trolley wires, trolley feeder wires, and bare signal wires shall be insulated adequately where they pass through doors and stoppings, and where they cross other power wires and cables. Trolley wires and trolley feeder wires shall be guarded adequately:
(a) At all points where men are required to work or pass regularly under the wires;

(b) On both sides of all doors and stoppings; and

(c) At man-trip stations.

The Secretary or his authorized representatives shall specify other conditions where trolley wires and trolley feeder wires shall be adequately protected to prevent contact by any person, or shall require the use of improved methods to prevent such contact. Temporary guards shall be provided where trackmen and other persons work in proximity to trolley wires and trolley feeder wires.

30 CFR §75.1003-1

Other requirements for guarding of trolley wires and trolley feeder wires.

Adequate precaution shall be taken to insure that equipment being moved along haulageways will not come in contact with trolley wires or trolley feeder wires.

30 CFR §75.1003-2

Requirements for movement of off-track mining equipment in areas of active workings where energized trolley wires or trolley feeder wires are present; pre-movement requirements; certified and qualified persons.

(a) Prior to moving or transporting any unit of off-track mining equipment in areas of the active workings where energized trolley wires or trolley feeder wires are present:

(1) The unit of equipment shall be examined by a certified person to ensure that coal dust, float coal dust, loose coal oil, grease, and other combustible materials have been cleaned up and have not been permitted to accumulate on such unit of equipment; and,

(2) A qualified person, as specified in §75.153 of this part, shall examine the trolley wires, trolley feeder wires, and the associated automatic circuit interrupting devices provided for short circuit protection to ensure that proper short circuit protection exists.

(b) A record shall be kept of the examinations required by paragraph (a) of this section, and shall be made available, upon request, to an authorized representative of the Secretary.

(c) Off-track mining equipment shall be moved or transported in areas of the active workings where energized trolley wires or trolley feeder wires are present only under the direct supervision of a certified person who shall be physically present at all times during moving or transporting operations.

(d) The frames of off-track mining equipment being moved or transported, in accordance with this section, shall be covered on the top and on the trolley wire side with fire-resistant material which has met the applicable requirements of Part 18 of Subchapter D of this chapter (Bureau of Mines Schedule 2G).

(e) Electrical contact shall be maintained between the mine track and the frames of off-track mining equipment being moved in-track and trolley entries, except that rubber-tired equipment need not be grounded to a transporting vehicle if no metal part of such rubber-tired equipment can come into contact with the transporting vehicle.

(f) A minimum vertical clearance of 12 inches shall be maintained between the farthest projection of the unit of equipment which is being moved and the energized trolley wires or trolley feeder wires at all times during the movement or transportation of such

equipment; provided, however, that if the height of the coal seam does not permit 12 inches of vertical clearance to be so maintained, the following additional precautions shall be taken:

(1)(i) Except as provided in paragraph (f)(1)(ii) of this section electric power shall be supplied to the trolley wires or trolley feeder wires only from outby the unit of equipment being moved or transported. (ii) Where direct current electric power is used and such electric power can be supplied only from inby the equipment being moved or transported, power may be supplied from inby such equipment provided a miner with the means to cut off the power, and in direct communication with persons actually engaged in the moving or transporting operation, is stationed outby the equipment being moved.

(2) The settings of automatic circuit interrupting devices used to provide short circuit protection for the trolley circuit shall be reduced to not more than one-half of the maximum current that could flow if the equipment being moved or transported were to come into contact with the trolley wire or trolley feeder wire;

(3) At all times the unit of equipment is being moved or transported, a miner shall be stationed at the first automatic circuit breaker outby the equipment being moved and such miner shall be: (i) In direct communication with persons actually engaged in the moving or transporting operation, and (ii) capable of communicating with the responsible person on the surface required to be on duty in accordance with §75.1600-1 of this part;

(4) Where trolley phones are utilized to satisfy the requirements of paragraph (f)(3) of this section, telephones or other equivalent two-way communication devices that can readily be connected with the mine communication system shall be carried by the miner stationed at the first automatic circuit breaker outby the equipment being moved and by a miner actually engaged in the moving or transporting operation; and,

(5) No person shall be permitted to be inby the unit of equipment being moved or transported, in the ventilating current of air that is passing over such equipment, except those persons directly engaged in moving such equipment.

(g) The provisions of paragraphs (a) through (f) of this section shall not apply to units of mining equipment that are transported in mine cars, provided that no part of the equipment extends above or over the sides of the mine car.

[38 FR 29998, Oct. 31, 1973, as amended at 47 FR 14706, Apr. 6, 1982; 60 FR 33719, June 29, 1995]

Subpart L--Fire Protection

30 CFR §75.1100

Requirements

Each coal mine shall be provided with suitable firefighting equipment adapted for the size and conditions of the mine. The Secretary shall establish minimum requirements of the type, quality, and quantity of such equipment.

30 CFR §75.1100-1

Type and quality of firefighting equipment.

Firefighting equipment required under this subpart shall meet the following minimum requirements:

(a) Waterlines: Waterlines shall be capable of delivering 50 gallons of water a minute at a nozzle pressure of 50 pounds per square inch.

(b) Portable water cars: A portable water car shall be of at least 1,000 gallons capacity (500 gallons capacity for anthracite mines) and shall have at least 300 feet of fire hose with nozzles. A portable water car shall be capable of providing a flow through the hose of 50 gallons of water per minute at a nozzle pressure of 50 pounds per square inch.

(c) A portable chemical car shall carry enough chemicals to provide a fire extinguishing capacity equivalent to that of a portable water car.

(d) Portable foam-generating machines or devices: A portable foam-generating machine or device shall have facilities and equipment for supplying the machine with 30 gallons of water per minute at 30 pounds per square inch for a period of 35 minutes.

(e) Portable fire extinguisher: A portable fire extinguisher shall be either (1) a multipurpose dry chemical type containing a nominal weight of 5 pounds of dry powder and enough expellant to apply the powder or (2) a foam-producing type containing at least 2 1/2 gallons of foam-producing liquids and enough expellant to supply the foam. Only fire extinguishers approved by the Underwriters Laboratories, Inc., or Factory Mutual Research Corp., carrying appropriate labels as to type and purpose, shall be used. After March 30, 1971, all new portable fire extinguishers acquired for use in a coal mine shall have a 2A 10 BC or higher rating.

(f) (1) Except as provided in paragraph (f)(2) of this section, the fire hose shall be lined with a material having flame resistant qualities meeting requirements for hose in Bureau of Mines' Schedule 2G. The cover shall be polyester, or other material with flame-spread qualities and mildew resistance equal or superior to polyester. The bursting pressure shall be at least 4 times the water pressure at the valve to the hose inlet with the valve closed; the maximum water pressure in the hose nozzle shall not exceed 100 p.s.i.g.

(2) Fire hose installed for use in underground coal mines prior to December 30, 1970, shall be mildew-proof and have a bursting pressure at least 4 times the water pressure at the valve to the hose inlet with the valve closed, and the maximum water pressure in the hose nozzle with water flowing shall not exceed 100 p.s.i.g.

30 CFR §75.1100-2

Quantity and location of firefighting equipment.

(a) *Working sections.* (1) Each working section of coal mines producing 300 tons or more per shift shall be provided with two portable fire extinguishers and 240 pounds of rock dust in bags or other suitable containers; waterlines shall extend to each section loading point and be equipped with enough fire hose to reach each working face unless the section loading point is provided with one of the following:

(i) Two portable water cars; or

(ii) Two portable chemical cars; or

(iii) One portable water car or one portable chemical car, and either (*a*) a portable foam-generating machine or (*b*) a portable high-pressure rock-dusting machine fitted with at least 250 feet of hose and supplied with at least 60 sacks of rock dust.

(2) Each working section of coal mines producing less than 300 tons of coal per shift shall be provided with the following:

(i) Two portable fire extinguishers; and

(ii) 240 pounds of rock dust in bags or other suitable containers; and

(iii) At least 500 gallons of water and at least three pails of 10-quart capacity; or a waterline with sufficient hose to reach the working places; or a portable water car of at least 500-gallons capacity; or a portable, all-purpose, dry-powder chemical car of at least 125-pounds capacity.

(3) As an alternative to paragraph (a)(2) of this section, each working section with no electrical equipment at the face of an anthracite coal mine producing less than 300 tons of coal per shift shall be provided with the following:

(i) Portable fire extinguishers containing a total capacity of at least 30 pounds of dry chemical or 15 gallons of foam and located at the entrance to the gangway at the bottom of the slope; and

(ii) Portable fire extinguishers containing a total capacity of at least 20 pounds of dry chemical or 10 gallons of foam and located within 500 feet from the working face.

(b) *Belt conveyors.* In all coal mines, waterlines shall be installed parallel to the entire length of belt conveyors and shall be equipped with firehose outlets with valves at 300-foot intervals along each belt conveyor and at tailpieces. At least 500 feet of firehose with fittings suitable for connection with each belt conveyor waterline system shall be stored at strategic locations along the belt conveyor. Waterlines may be installed in entries adjacent to the conveyor entry belt as long as the outlets project into the belt conveyor entry.

(c) *Haulage tracks.* (1) In mines producing 300 tons of coal or more per shift waterlines shall be installed parallel to all haulage tracks using mechanized equipment in the track or adjacent entry and shall extend to the loading point of each working section. Waterlines shall be equipped with outlet valves at intervals of not more than 500 feet, and 500 feet of firehose with fittings suitable for connection with such waterlines shall be provided at strategic locations. Two portable water cars, readily available, may be used in lieu of waterlines prescribed under this paragraph.

(2) In mines producing less than 300 tons of coal per shift, there shall be provided at 500-foot intervals in all main and secondary haulage roads:

(i) A tank of water of at least 55-gallon capacity with at least 3 pails of not less than 10-quart capacity; or

(ii) Not less than 240 pounds of bagged rock dust.

(d) *Transportation.* Each track or off-track locomotive, self-propelled man-trip car, or personnel carrier shall be equipped with one portable fire extinguisher.

(e) *Electrical installations.* At each electrical installation, the operator shall provide two portable fire extinguishers that have a nominal capacity of 5 pounds of dry chemical, or one extinguisher that has a nominal capacity of at least 10 pounds of dry chemical, and which have a 2-A:10-B:C or higher rating.

(f) *Oil storage stations.* Two portable fire extinguishers and 240 pounds of rock dust, shall be provided at each permanent underground oil storage station. One portable fire extinguisher shall be provided at each working section where 25 gallons or more of oil are stored in addition to extinguishers required under paragraph (a) of this section.

(g) *Welding, cutting, soldering.* One portable fire extinguisher or 240 pounds of rock dust shall be provided at locations where welding, cutting, or soldering with arc or flame is being done.

(h) Powerlines. At each wooden door through which powerlines pass there shall be one portable fire extinguisher or 240 pounds of rock dust within 25 feet of the door on the intake air side.

(i) Emergency materials. (1) At each mine producing 300 tons of coal or more per shift there shall be readily available the following materials at locations not exceeding 2 miles from each working section:

1,000 board feet of brattice boards
2 rolls of brattice cloth
2 hand saws
25 pounds of 8 d nails
25 pounds of 10 d nails
25 pounds of 16 d nails
3 claw hammers
25 bags of wood fiber plaster or 10 bags of cement (or equivalent material for stoppings)
5 tons of rock dust

(2) At each mine producing less than 300 tons of coal per shift the above materials shall be available at the mine, provided, however, that the emergency materials for one or

more mines may be stored at a central warehouse or building supply company and such supply must be the equivalent of that required for all mines involved and within 1-hour's delivery time from each mine. This exception shall not apply where the active working sections are more than 2 miles from the surface.

[35 FR 17890, Nov. 20, 1970, as amended at 73 FR 53127, Sept. 15, 2008]

30 CFR §75.1100-3

Condition and examination of firefighting equipment.

All firefighting equipment shall be maintained in a usable and operative condition. Chemical extinguishers shall be examined every 6 months and the date of the examination shall be written on a permanent tag attached to the extinguisher.

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14706, Apr. 6, 1982; 60 FR 33719, June 29, 1995]

30 CFR §75.1101

Deluge-type water sprays, foam generators; main and secondary belt-conveyor drives.

Deluge-type water sprays or foam generators automatically actuated by rise in temperature, or other no less effective means approved by the Secretary of controlling fire, shall be installed at main and secondary belt-conveyor drives.

30 CFR §75.1101-1

Deluge-type water spray systems.

(a) Deluge-type spray systems shall consist of open nozzles attached to branch lines. The branch lines shall be connected to a waterline through a control valve operated by a fire sensor. Actuation of the control valve shall cause water to flow into the branch lines and discharge from the nozzles.

(b) Nozzles attached to the branch lines shall be full cone, corrosion resistant and provided with blow-off dust covers. The spray application rate shall not be less than 0.25 gallon per minute per square foot of the top surface of the top belt and the discharge shall be directed at both the upper and bottom surfaces of the top belt and to the upper surface of the bottom belt.

30 CFR §75.1101-2

Installation of deluge-type sprays.
Deluge-type water spray systems shall provide protection for the belt drive and 50 feet of fire-resistant belt or 150 feet of nonfire-resistant belt adjacent to the belt drive.

30 CFR §75.1101-3

Water requirements.

Deluge-type water spray systems shall be attached to a water supply. Water so supplied shall be free of excessive sediment and noncorrosive to the system Water pressure shall be maintained consistent with the pipe, fittings, valves, and nozzles at all times. Water systems shall include strainers with a flush-out connection and a manual shut-off valve. The water supply shall be adequate to provide flow for 10 minutes except that pressure tanks used as a source of water supply shall be of 1,000-gallon capacity for a fire-resistant belt and 3,000 gallons for a nonfire-resistant belt may be provided.

30 CFR §75.1101-4

Branch lines.

As a part of the deluge-type water spray system, two or more branch lines of nozzles shall be installed. The maximum distance between nozzles shall not exceed 8 feet.

30 CFR §75.1101-5

Installation of foam generator systems.

(a) Foam generator systems shall be located so as to discharge foam to the belt drive, belt takeup, electrical controls, gear reducing unit and the conveyor belt.

(b) Foam generator systems shall be equipped with a fire sensor which actuates the system, and each system shall be capable of producing and delivering the following amounts of foam within 5 minutes:

(1) At fire-resistant belt installations, an amount which will fully envelop the belt drive, belt takeup, electrical controls, gear reducing unit, and the conveyor belt over a distance of 50 feet; and,

(2) At nonfire-resistant belt installations, an amount which will fully envelop the belt drive, belt takeup electrical controls, gear reducing unit, and the conveyor belt over a distance of 150 feet.

(c) The foam generator shall be equipped with a warning device designed to stop the belt drive when a fire occurs and all such warning devices shall be capable of giving both an audible and visual signal when actuated by fire.

(d) Water, power, and chemicals required shall be adequate to maintain water or foam flow for no less than 25 minutes.

(e) Water systems shall include strainers with a flush-out connection and a manual shut-off valve.

30 CFR §75.1101-6

Water sprinkler systems; general.

Water sprinkler systems may be installed to protect main and secondary belt-conveyor drives, however, where such systems are employed, they shall be installed and maintained in accordance with §§75.1101-7 through 75.1101-11.

30 CFR §75.1101-7

Installation of water sprinkler systems; requirements.

(a) The fire-control components of each water sprinkler system shall be installed, as far as practicable in accordance with the recommendations set forth in National Fire Protection Association 1968-69 edition, Code No. 13, "Installation of Sprinkler Systems" and such systems' components shall be of a type approved by the Underwriters' Laboratories, Inc., Factory Mutual Research Corp.

(b) Each sprinkler system shall provide protection for the motor drive belt takeup, electrical controls, gear reducing unit, and the 50 feet of fire-resistant belt, or 150 feet of nonfire-resistant belt adjacent to the belt drive.

(c) The components of each water sprinkler system shall be located so as to minimize the possibility of damage by roof fall or by the moving belt and its load.

30 CFR §75.1101-8

Water sprinkler systems; arrangement of sprinklers.

(a) At least one sprinkler shall be installed above each belt drive, belt take-up, electrical control, and gear-reducing unit, and individual sprinklers shall be installed at intervals of no more than 8 feet along all conveyor branch lines.

(b) Two or more branch lines, at least one of which shall be above the top belt and one between the top and bottom belt, shall be installed in each sprinkler system to provide a uniform discharge of water to the belt surface.

(c) The water discharge rate from the sprinkler system shall not be less than 0.25 gallon per minute per square foot of the top surface of the top belt and the discharge shall be directed at both the upper and bottom surfaces of the top belt and to the upper surface of the bottom belt. The supply of water shall be adequate to provide a constant flow of water for 10 minutes with all sprinklers functioning.

(d) Each individual sprinkler shall be activated at a temperature of not less than 150° F. and not more than 300° F.

(e) Water systems shall include strainers with a flush-out connection and a manual shut-

off valve.

30 CFR §75.1101-9

Back-up water system.

One fire hose outlet together with a length of hose capable of extending to the belt drive shall be provided within 300 feet of each belt drive.

30 CFR §75.1101-10

Water sprinkler systems; fire warning devices at belt drives.

Each water sprinkler system shall be equipped with a device designed to stop the belt drive in the event of a rise in temperature and each such warning device shall be capable of giving both an audible and visual warning when a fire occurs.

30 CFR §75.1101-11

Inspection of water sprinkler systems.

Each water sprinkler system shall be examined weekly and a functional test of the complete system shall be conducted at least once each year

30 CFR §75.1101-12

Equivalent dry-pipe system.

Where water sprinkler systems are installed to protect main and secondary belt conveyor drives and freezing temperatures prevail, an equivalent dry-pipe system may be installed.

30 CFR §75.1101-13

Dry powder chemical systems; general.

Self-contained dry powder chemical systems may be installed to protect main and secondary belt conveyor drives, however, where such systems are employed, they shall be installed and maintained in accordance with the provisions of §§75.1101-14 through 75.1101-22.

30 CFR §75.1101-14

Installation of dry powder chemical systems.

(a) Self-contained dry powder chemical systems shall be installed to protect each belt-drive, belt takeup, electrical-controls, gear reducing units and 50 feet of fire-resistant belt or 150 feet of non-fire-resistant belt adjacent to the belt drive.

(b) The fire-control components of each dry powder chemical system shall be a type approved by the Underwriters' Laboratories, Inc., or Factory Mutual Engineering Corp.

(c) The components of each dry powder chemical system shall be located so as to minimize the possibility of damage by roof fall or by the moving belt and its load.

30 CFR §75.1101-15

Construction of dry powder chemical systems.

(a) Each self-contained dry powder system shall be equipped with hose or pipe lines which are no longer than necessary.

(b) Metal piping and/or hose between control valves and nozzles shall have a minimum bursting pressure of 500 p.s.i.g.

(c) Hose shall be protected by wire braid or its equivalent.

(d) Nozzles and reservoirs shall be sufficient in number to provide maximum protection to each belt, belt takeup, electrical controls, and gear reducing unit.

(e) Each belt shall be protected on the top surface of both the top and bottom belts and the bottom surface of the top belt.

30 CFR §75.1101-16

Dry powder chemical systems; sensing and fire-suppression devices.

(a) Each self-contained dry powder chemical system shall be equipped with sensing devices which shall be designed to activate the fire-control system, sound an alarm and stop the conveyor drive motor in the event of a rise in temperature, and provision shall be made to minimize contamination of the lens of any optical sensing device installed in such system.

(b) Where sensors are operated from the same power source as the belt drive, each sensor shall be equipped with a standby power source which shall be capable of remaining operative for at least 4 hours after a power cutoff.

(c) Sensor systems shall include a warning indicator (or test circuit) which shows it is operative.

(d) Each fire-suppression system shall be equipped with a manually operated control valve which shall be independent of the sensor.

30 CFR §75.1101-17

Sealing of dry powder chemical systems.

Each dry powder chemical system shall be adequately sealed to protect all components of the system from moisture dust, and dirt.

30 CFR §75.1101-18

Dry powder requirements.

Each dry powder chemical system shall contain the following minimum amounts of multipurpose dry powder:

Belt	Dry powder, pounds
Fire resistant	125
Non-fire resistant	250

30 CFR §75.1101-19

Nozzles; flow rate and direction.

The nozzles of each dry powder chemical system shall be capable of discharging all powder within 1 minute after actuation of the system and such nozzles shall be directed so as to minimize the effect of ventilation upon fire control.

30 CFR §75.1101-20

Safeguards for dry powder chemical systems.

Adequate guards shall be provided along all belt conveyors in the vicinity of each dry powder chemical system to protect persons whose vision is restricted by a discharge of powder from the system. In addition, hand-rails shall be installed in such areas to provide assistance to those passing along the conveyor after a powder discharge.

30 CFR §75.1101-21

Back-up water system.

One fire hose outlet together with a length of hose capable of extending to the belt drive shall be provided within 300 feet of each belt drive.

30 CFR §75.1101-22

Inspection of dry powder chemical systems.

(a) Each dry powder chemical system shall be examined weekly and a functional test of

the complete system shall be conducted at least once each year.

(b) Where the dry powder chemical system has been actuated, all components of the system shall be cleaned immediately by flushing all powder from pipes and hoses and all hose damaged by fire shall be replaced.

30 CFR §75.1102

Slippage and sequence switches.

Underground belt conveyors shall be equipped with slippage and sequence switches.

30 CFR §75.1103

Automatic fire warning devices.

On or before May 29, 1970, devices shall be installed on all such belts which will give a warning automatically when a fire occurs on or near such belt. The Secretary shall prescribe a schedule for installing fire suppression devices on belt haulageways.

30 CFR §75.1103-1

Automatic fire sensors.

A fire sensor system shall be installed on each underground belt conveyor. Sensors so installed shall be of a type which will (a) give warning automatically when a fire occurs on or near such belt; (b) provide both audible and visual signals that permit rapid location of the fire.

30 CFR §75.1103-2

Automatic fire sensors; approved components; installation requirements.

(a) The components of each automatic fire sensor required to be installed in accordance with the provisions of §75.1103-1 shall be of a type and installed in a manner approved by the Secretary, or the components shall be of a type listed, approved and installed in accordance with the recommendations of a nationally recognized testing laboratory approved by the Secretary.

(b) Where applicable, and not inconsistent with these regulations, automatic fire sensors shall be installed in accordance with the recommendations set forth in National Fire Code No. 72A "Local Protective Signaling Systems" (NFPA No. 72A-1967). National Fire Code No. 72A (1967) is hereby incorporated by reference and made a part hereof. National Fire Code No. 72A is available for examination at each MSHA Coal Mine Safety and Health district office, and may be obtained from the National Fire Protection Association, 11 Tracy Drive, Avon, MA 02322; Telephone: 800-344-3555 (toll free); *http://www.nfpa.org.*

[37 FR 16546, Aug. 16, 1972, as amended at 71 FR 16668, Apr. 3, 2006]

30 CFR §75.1103-3

Automatic fire sensor and warning device systems; minimum requirements; general.

Automatic fire sensor and warning device systems installed in belt haulageways of underground coal mines shall be assembled from components which meet the minimum requirements set forth in §§75.1103-4 through 75.1103-7 unless otherwise approved by the Secretary.

[37 FR 16545, Aug. 16, 1972]

30 CFR §75.1103-4

Automatic fire sensor and warning device systems; installation; minimum requirements.

(a) Effective December 31, 2009, automatic fire sensor and warning device systems that use carbon monoxide sensors shall provide identification of fire along all belt conveyors.

(1) Carbon monoxide sensors shall be installed at the following locations:

(i) Not more than 100 feet downwind of each belt drive unit, each tailpiece transfer point, and each belt take-up. If the belt drive, tailpiece, and/or take-up for a single transfer point are installed together in the same air course, and the distance between the units is less than 100 feet, they may be monitored with one sensor downwind of the last component. If the distance between the units exceeds 100 feet, additional sensors are required downwind of each belt drive unit, each tailpiece transfer point, and each belt take-up;

(ii) Not more than 100 feet downwind of each section loading point;

(iii) Along the belt entry so that the spacing between sensors does not exceed 1,000 feet. Where air velocities are less than 50 feet per minute, spacing must not exceed 350 feet; and

(iv) The mine operator shall indicate the locations of all carbon monoxide sensors on the mine maps required by §§ 75.1200 and 75.1505 of this part.

(2) Where used, sensors responding to radiation, smoke, gases, or other indications of fire, shall be spaced at regular intervals to provide protection equivalent to carbon monoxide sensors, and installed within the time specified in paragraph (a)(3) of this section.

(3) When the distance from the tailpiece at loading points to the first outby sensor reaches the spacing requirements in §75.1103-4(a)(1)(iii), an additional sensor shall be installed and put in operation within 24 production shift hours. When sensors of the kind described in paragraph (a)(2) of this section are used, they shall be installed and put in operation within 24 production shift hours after the equivalent distance which has been established for the sensor from the tailpiece at loading points to the first outby sensor is first reached.

(b) Automatic fire sensor and warning device systems shall be installed so as to minimize the possibility of damage from roof falls and the moving belt and its load. Sensors must be installed near the center in the upper third of the entry, in a manner that does not expose personnel working on the system to unsafe conditions. Sensors must not be located in abnormally high areas or in other locations where air flow patterns do not permit products of combustion to be carried to the sensors.

(c) Infrared, ultraviolet, and other sensors whose effectiveness is impaired by contamination shall be protected from dust, dirt, and moisture.

(d) The voltage of automatic fire sensor and warning device systems shall not exceed 120 volts.

(e) Except when power must be cut off in the mine under the provisions of §75.313, automatic fire sensor and warning device systems shall be capable of giving warning of fire for a minimum of 4 hours after the source of power to the belt is removed unless the belt haulageway is examined for hot rollers and fire as provided in paragraph (e) (1) or (2) of this section.

(1) When an unplanned removal of power from the belt occurs an examination for hot rollers and fire in the operating belts of a conveyor system shall be completed within 2 hours after the belt has stopped.

(2) When a preplanned removal of power from the belt occurs an examination for hot rollers and fire on the operating belts of a conveyor system may commence not more than 30 minutes before the belts are stopped and shall be completed within 2 hours after the examination is commenced, or the examination shall be commenced when the belts are stopped and completed within 2 hours after the belts are stopped.

[37 FR 16545, Aug. 16, 1972, as amended at 57 FR 20928, May 15, 1992; 73 FR 80614, Dec. 31, 2008]

30 CFR §75.1103-5

Automatic fire warning devices; actions and response.

(a) When the carbon monoxide level reaches 10 parts per million above the established ambient level at any sensor location, automatic fire sensor and warning device systems shall provide an effective warning signal at the following locations:

(1) At working sections and other work locations where miners may be endangered from a fire in the belt entry.

(2) At a manned surface location where personnel have an assigned post of duty. The manned surface location must have:

(i) A telephone or equivalent communication with all miners who may be endangered and

(ii) A map or schematic that shows the locations of sensors, and the intended air flow direction at these locations. This map or schematic must be updated within 24 hours of any change in this information.

(3) The automatic fire sensor and warning device system shall be monitored for a period of 4 hours after the belt is stopped, unless an examination for hot rollers and fire is made as prescribed in §75.1103-4(e).

(b) The fire sensor and warning device system shall include a means for rapid evaluation of electrical short and open circuits, ground faults, pneumatic leaks, or other defect detrimental to its proper operational condition.

(c) Automatic fire sensor and warning devices shall include a manual reset feature.

(d) When a malfunction or warning signal is received at the manned surface location, the sensors that are activated must be identified and appropriate personnel immediately notified.

(e) Upon notification of a malfunction or warning signal, appropriate personnel must immediately initiate an investigation to determine the cause of the malfunction or warning signal and take the required actions set forth in paragraph (f) of this section.

(f) If any sensor indicates a warning, the following actions must be taken unless the mine operator determines that the signal does not present a hazard to miners:

(1) Appropriate personnel must notify miners in affected working sections, in affected areas where mechanized mining equipment is being installed or removed, and at other locations specified in the approved mine emergency evacuation and firefighting program of instruction; and

(2) All miners in the affected areas, unless assigned emergency response duties, must be immediately withdrawn to a safe location identified in the mine emergency evacuation and firefighting program of instruction.

(g) If the warning signal will be activated during calibration of sensors, personnel manning the surface location must be notified prior to and upon completion of calibration. Affected working sections, areas where mechanized mining equipment is being installed or removed, or other areas designated in the approved emergency evacuation and firefighting program of instruction must be notified at the beginning and completion of calibration.

(h) If any fire detection component becomes inoperative, immediate action must be taken to repair the component. While repairs are being made, operation of the belt may continue if the following requirements are met:

(1) If one sensor becomes inoperative, a trained person must continuously monitor for carbon monoxide at the inoperative sensor;

(2) If two or more adjacent sensors become inoperative, trained persons must patrol and continuously monitor the affected areas for carbon monoxide so that they will be traveled each hour in their entirety. Alternatively, a trained person must be stationed at each inoperative sensor to monitor for carbon monoxide;

(3) If the complete fire detection system becomes inoperative, trained persons must patrol and continuously monitor the affected areas for carbon monoxide so that they will be traveled each hour in their entirety;

(4) Trained persons who conduct monitoring under this section must have two-way voice communication capability, at intervals not to exceed 2,000 feet, and must report carbon monoxide concentrations to the surface at intervals not to exceed one hour;

(5) Trained persons who conduct monitoring under this section must immediately report to the surface any concentration of carbon monoxide that reaches 10 parts per million above the established ambient level, unless the mine operator knows that the source of the carbon monoxide does not present a hazard to miners; and

(6) Handheld detectors used to monitor the belt entry under this section must have a detection level equivalent to that of the system's carbon monoxide sensors.

[37 FR 16545, Aug. 16, 1972, as amended at 73 FR 80615, Dec. 31, 2008]

30 CFR §75.1103-6

Automatic fire sensors; actuation of fire suppression systems.

Point-type heat sensors or automatic fire sensor and warning device systems may be used to actuate deluge-type water systems, foam generator systems, multipurpose dry-powder systems, or other equivalent automatic fire suppression systems.

[73 FR 80615, Dec. 31, 2008]

30 CFR §75.1103-7

Electrical components; permissibility requirements.

The electrical components of each automatic fire sensor and warning device system shall:

(a) Remain functional when the power circuits are de-energized as required by §75.706; and

(b) Be provided with protection against ignition of methane or coal dust when the electrical power is de-energized as required by §75.313, but these components shall be permissible or intrinsically safe if installed in a return airway.

[37 FR 16546, Aug. 16, 1972, as amended at 57 FR 20929, May 15, 1992]

30 CFR §75.1103-8

Automatic fire sensor and warning device systems; inspection and test requirements.

(a) Automatic fire sensor and warning device systems shall be examined at least once each shift when belts are operated as part of a production shift. A functional test of the warning signals shall be made at least once every seven days. Examination and maintenance of such systems shall be by a qualified person.

(b) A record of the functional test conducted in accordance with paragraph (a) of this section shall be maintained by the operator and kept for a period of one year.

(c) Sensors shall be calibrated in accordance with the manufacturer's calibration instructions at intervals not to exceed 31 days. A record of the sensor calibrations shall be maintained by the operator and kept for a period of one year.

[73 FR 80615, Dec. 31, 2008]

30 CFR §75.1103-9

Minimum requirements; fire suppression materials and location; maintenance of entries and crosscuts; access doors; communications; fire crews; high-expansion foam devices.

(a) The following materials shall be stored within 300 feet of each belt drive or at a location where the material can be moved to the belt drive within 5 minutes, except that when the ventilating current in the belt haulageway travels in the direction of the normal movement of coal on the belt, the materials shall be stored within 300 feet of the belt tailpiece or at a location where the materials can be moved to the belt tailpiece within 5 minutes.

(1) 500 feet of fire hose, except that if the belt flight is less than 500 feet in length the fire hose may be equal to the length of the belt flight. A high expansion foam device may be substituted for 300 feet of the 500 feet of the fire hose. Where used, such foam generators shall produce foam sufficient to fill 100 feet of the belt haulageway in not more than 5 minutes. Sufficient power cable and water hose shall be provided so that the foam generator can be installed at any crosscut along the belt by which the generator is located. A 1-hour supply of foam producing chemicals and tools and hardware required for its operation shall be stored at the foam generator.

(2) Tools to open a stopping between the belt entry and the adjacent intake entry; and

(3) 240 pounds of bagged rock dust.

(b) The entry containing the main waterline and the crosscuts containing water outlets between such entry and the belt haulageway (if the main waterline is in an adjacent entry) shall be maintained accessible and in safe condition for travel and firefighting activities. Each stopping in such crosscuts or adjacent crosscuts shall have an access door.

(c) Suitable communication lines extending to the surface shall be provided in the belt haulageway or adjacent entry.

(d) The fire suppression system required at the belt drive shall include the belt discharge head.

(e) A crew consisting of at least five members for each working shift shall be trained in firefighting operations. Fire drills shall be held at intervals not exceeding 6 months.

[37 FR 16546, Aug. 16, 1972]

30 CFR §75.1103-10

Fire suppression systems; additional requirements.

For each conveyor belt flight exceeding 2,000 feet in length, where the average air velocity along the belt haulage entry exceeds 100 feet per minute, an additional cache of the materials specified in §75.1103-9(a)(1), (2), and (3) shall be provided. The additional cache may be stored at the locations specified in §75.1103-9(a), or at some other strategic location readily accessible to the conveyor belt flight.

[73 FR 80616, Dec. 31, 2008]

30 CFR §75.1103-11

Tests of fire hydrants and fire hose; record of tests.

Each fire hydrant shall be tested by opening to insure that it is in operating condition, and each fire hose shall be tested, at intervals not exceeding 1 year. A record of these tests shall be maintained at an appropriate location.

[37 FR 16546, Aug. 16, 1972]

30 CFR §75.1104

Underground storage, lubricating oil and grease.

Underground storage places for lubricating oil and grease shall be of fireproof construction. Except for specially prepared materials approved by the Secretary, lubricating oil and grease kept in all underground areas in a coal mine shall be in fireproof, closed metal containers or other no less effective containers approved by the Secretary.

30 CFR §75.1105

Housing of underground transformer stations, battery-charging stations, substations, compressor stations, shops, and permanent pumps.

Underground transformer stations, battery-charging stations, substations, compressor stations, shops, and permanent pumps shall be housed in fireproof structures or areas. Air currents used to ventilate structures or areas enclosing electrical installations shall be coursed directly into the return. Other underground structures installed in a coal mine as the Secretary may prescribe shall be of fireproof construction.

30 CFR §75.1106

Welding, cutting, or soldering with arc or flame underground.

All welding, cutting, or soldering with arc or flame in all underground areas of a coal mine shall, whenever practicable, be conducted in fireproof enclosures. Welding, cutting, or soldering with arc or flame in other than a fireproof enclosure shall be done under the supervision of a qualified person who shall make a diligent search for fire during and after such operations and shall, immediately before and during such operations, continuously test for methane with means approved by the Secretary for detecting methane. Welding, cutting, or soldering shall not be conducted in air that contains 1.0 volume per centum or more of methane. Rock dust or suitable fire extinguishers shall be immediately available during such welding, cutting or soldering.

30 CFR §75.1106-1

Test for methane.

Until December 31, 1970, a permissible flame safety lamp may be used to make tests for methane required by the regulations in this part. On and after December 31, 1970 a methane detector approved by the Secretary shall be used for such tests and a permissible flame safety lamp may be used as a supplemental testing device. A person qualified to test for methane under §75.151 will be a qualified person for the purpose of this section.

30 CFR §75.1106-2

Transportation of liquefied and nonliquefied compressed gas cylinders; requirements.

(a) Liquefied and nonliquefied compressed gas cylinders transported into or through an underground coal mine shall be:

(1) Placed securely in devices designed to hold the cylinder in place during transit on self-propelled equipment or belt conveyors;

(2) Disconnected from all hoses and gages;

(3) Equipped with a metal cap or "headband" (fence-type metal protector around the valve stem) to protect the cylinder valve during transit; and,

(4) Clearly labeled "empty" or "MT" when the gas in the cylinder has been expended.

(b) In addition to the requirements of paragraph (a) of this section, when liquefied and nonliquefied compressed gas cylinders are transported by a trolley wire haulage system into or through an underground coal mine, such cylinders shall be placed in well insulated and substantially constructed containers which are specifically designed for holding such cylinders.

(c) Liquefied and nonliquefied compressed gas cylinders shall not be transported on mantrips.

[36 FR 22061, Nov. 19, 1971]

30 CFR §75.1106-3

Storage of liquefied and nonliquefied compressed gas cylinders; requirements.

(a) Liquefied and nonliquefied compressed gas cylinders stored in an underground coal mine shall be:

(1) Clearly marked and identified as to their contents in accordance with Department of Transportation regulations.

(2) Placed securely in storage areas designated by the operator for such purpose, and where the height of the coalbed permits, in an upright position, preferably in specially designated racks, or otherwise secured against being accidently tipped over.

(3) Protected against damage from falling material, contact with power lines and energized electrical equipment, heat from welding, cutting or soldering, and exposure to flammable liquids.

(b) Liquefied and nonliquefied compressed gas cylinders shall not be stored or left unattended in any area inby the last open crosscut of an underground coal mine.

(c) When not in use, the valves of all liquefied and nonliquefied compressed gas cylinders shall be in the closed position, and all hoses shall be removed from the cylinder.

[36 FR 22061, Nov. 19, 1971]

30 CFR §75.1106-4

Use of liquefied and nonliquefied compressed gas cylinders; general requirements.

(a) Persons assigned by the operator to use and work with liquefied and nonliquefied compressed gas shall be trained and designated by the operator as qualified to perform the work to which they are assigned, and such qualified persons shall be specifically instructed with respect to the dangers inherent in the use of such gases in an underground coal mine.

(b) Persons who perform welding, cutting, or burning operations shall wear clothing free from excessive oil or grease.

(c) Liquefied and nonliquefied compressed gas shall be used only in well-ventilated areas.

(d) Not more than one liquefied or nonliquefied compressed gas unit, consisting of one oxygen cylinder and one additional gas cylinder, shall be used to repair any unit of equipment which is inby the loading point of any section.

(e) Where liquefied and nonliquefied compressed gas is used regularly in underground shops or other underground structures, such shops or structures shall be on a separate split of air.

(f) Where liquefied and nonliquefied compressed gas is used in any area in which oil, grease, or coal dust is present, oil and grease deposits shall, where practicable, be removed and the entire area within 10 feet of the worksite covered with a heavy coating of rock dust.

(g) Liquefied and nonliquefied compressed gas cylinders shall be located no less than 10 feet from the worksite, and where the height of the coal seam permits, they shall be placed in an upright position and chained or otherwise secured against falling.

(h) Liquefied and nonliquefied compressed gas shall not be used under direct pressure from the cylinder and, where such gases are used under reduced pressure, the pressure level shall not exceed that recommended by the manufacturer.

(i) Manifolding cylinders" shall only be performed in well-ventilated shops where the necessary equipment is properly installed and operated in accordance with specifications for safety prescribed by the manufacturer.

30 CFR §75.1106-5

Maintenance and tests of liquefied and nonliquefied compressed gas cylinders; accessories and equipment; requirements.

(a) Hose lines, gages, and other cylinder accessories shall be maintained in a safe operating condition.

(b) Defective cylinders, cylinder accessories, torches, and other welding, cutting, and burning equipment shall be labeled "defective" and taken out of service.

(c) Each qualified person assigned to perform welding, cutting, or burning with liquefied and nonliquefied compressed gas shall be equipped with a wrench specifically designed for use with liquefied and nonliquefied compressed gas cylinders and a suitable torchtip cleaner to maintain torches in a safe operating condition.

(d) Tests for leaks on the hose valves or gages of liquefied and nonliquefied compressed gas cylinders shall only be made with a soft brush and soapy water or soap suds, or other device approved by the Secretary.

[36 FR 22062, Nov. 19, 1971]

30 CFR §75.1106-6

Exemption of small low pressure gas cylinders containing nonflammable or nonexplosive gas mixtures.

Small low pressure gas cylinders containing nonflammable or nonexplosive gas mixtures, which provide for the emission of such gas under a pressure reduced from a pressure which does not exceed 250 p.s.i.g., and which is manufactured and sold in conformance with U.S. Department of Transportation Special Permit No. 6029 as a calibration test kit for methane monitoring systems, shall be exempt from the requirements of §§75.1106-2(c) and 75.1106-4(d), (f) and (g).

[36 FR 22062, Nov. 19, 1971]

FIRE SUPPRESSION DEVICES AND FIRE-RESISTANT HYDRAULIC FLUIDS ON UNDERGROUND EQUIPMENT

30 CFR §75.1107

Fire suppression devices.

On and after March 30, 1971, fire-suppression devices meeting specifications prescribed by the Secretary shall be installed on unattended underground equipment and suitable fire-resistant hydraulic fluids approved by the Secretary shall be used in the hydraulic systems of such equipment. Such fluids shall be used in the hydraulic systems of other underground equipment unless fire suppression devices meeting specifications prescribed by the Secretary are installed on such equipment.

30 CFR §75.1107-1

Fire-resistant hydraulic fluids and fire suppression devices on underground equipment.

(a)(1) Unattended electrically powered equipment used underground which uses hydraulic fluid shall use approved fire-resistant hydraulic fluid.

(2) Except as provided in paragraph (a) (3) of this section, within 24 production shift hours after being installed, unattended electrically powered equipment used underground shall be equipped with a fire suppression device which meets the applicable requirements of §§75.1107-3 through 75.1107-16.

(3) Unattended enclosed motors, controls, transformers, rectifiers, and other similar noncombustible electrically powered equipment containing no flammable fluid may be protected:

(i) By an approved fire suppression device, or

(ii) Be located at least 2 feet from coal or other combustible materials, or

(iii) Be separated from the coal or combustible materials by a 4-inch-thick masonry firewall or equivalent; and be mounted on a minimum 4-inch-thick noncombustible

surface, platform, or equivalent. The electrical cables at such equipment shall conform with the requirements of Part 18 of this chapter (Bureau of Mines Schedule 2G) or be in metal conduit.

(b) Attended electrically powered equipment used underground which uses hydraulic fluid shall use approved fire-resistant hydraulic fluid unless such equipment is protected by a fire suppression device which meets the applicable requirements of §§75.1107-3 - 75.1107-16.

(c) For purpose of §§75.1107 - 75.1107-16 the following underground equipment shall be considered attended equipment:

(1) Any machine or device regularly operated by a miner assigned to operate such machine or device;

(2) Any machine or device which is mounted in the direct line of sight of a jobsite which is located within 500 feet of such machine or device and which jobsite is regularly occupied by a miner assigned to perform job duties at such jobsite during each production shift.

(d) Machines and devices described under paragraph (c) of this section must be inspected for fire and the input powerline de-energized when workmen leave the area for more than 30 minutes.

[37 FR 15301, July 29, 1972]

30 CFR §75.1107-2

Approved fire-resistant hydraulic fluids; minimum requirements.

Fire-resistant hydraulic fluids and concentrates required to be employed in the hydraulic system of underground equipment in accordance with the provisions of §75.1107-1 shall be considered suitable only if they have been produced under an approval, or any modification thereof, issued pursuant to Part 35 Subchapter I of this chapter (Bureau of Mines Schedule 30), or any revision thereof.

[37 FR 15301, July 29, 1972]

30 CFR §75.1107-3

Fire suppression devices; approved components; installation requirements.

(a) The components of each fire suppression device required to be installed in accordance with the provisions of §75.1107-1 shall be approved by the Secretary, or where appropriate be listed as approved by a nationally recognized agency approved by the Secretary.

(b) Where used, pressure vessels shall conform with the requirements of sections 3603, 3606, 3607, 3707, and 3708 of National Fire Code No. 22 "Water Tanks for Private Fire Protection" (NFPA No. 22-1971).

(c) The cover of hose of fire suppression devices, if used on the protected equipment and

installed after the effective date of this section, shall meet the flame-resistant requirements of Part 18 of this chapter (Bureau of Mines Schedule 2G).

(d) Fire suppression devices required to be installed in accordance with the provisions of §75.1107-1 shall where appropriate be installed in accordance with the manufacturer's specifications.

[37 FR 15301, July 29, 1972]

30 CFR §75.1107-4

Automatic fire sensors and manual actuators; installation; minimum requirements.

(a)(1) Where fire suppression devices are installed on unattended underground equipment, one or more point-type sensors or equivalent shall be installed for each 50 square feet of top surface area, or fraction thereof, of such equipment, and each sensor shall be designed to activate the first suppression system and disconnect the electrical power source to the equipment protected, and, except where sprinklers are used, there shall be in addition, a manual actuator installed to operate the system. Where sprinklers are used, provision shall be made for manual application of water to the protected equipment in lieu of a manual actuator.

(2) Two or more manual actuators, where practicable, shall be installed, as provided in paragraphs (a)(2) (i) and (ii) of this section, to activate fire suppression devices on attended equipment purchased on or after the effective date of this §75.1107-4. At least one manual actuator shall be used on equipment purchased prior to the effective date of this §75.1107-4.

(i) Manual actuators installed on attended equipment regularly operated by a miner, as provided in §75.1107-1(c)(1) shall be located at different locations on the equipment, and at least one manual actuator shall be located within easy reach of the operator's normal operating position.

(ii) Manual actuators to activate fire suppression devices on attended equipment not regularly operated by a miner, as provided in §75.1107-1(c)(2), shall be installed at different location, and at least one manual actuator shall be installed so as to be easily reached by the miner at the jobsite or by persons approaching the equipment.

(b) Sensors shall, where practicable, be installed in accordance with the recommendations set forth in National Fire Code No. 72A "Local Protective Signaling Systems" (NFPA No. 72A-1967).

(c) On unattended equipment the fire suppression device shall operate independently of the power to the main motor (or equivalent) so it will remain operative if the circuit breakers (or other protective device) actuates. On attended equipment powered through a trailing cable the fire suppression device shall operate independently of the electrical power provided by the cable.

(d) Point-type sensors (such as thermocouple, bimetallic strip, or rate of temperature rise) located in ventilated passageways shall be installed downwind from the equipment to be protected.

(e) Sensor systems shall include a device or method for determining their operative condition.

[37 FR 15301, July 29, 1972]

30 CFR §75.1107-5

Electrical components of fire suppression devices; permissibility requirements.

The electrical components of each fire suppression device used on permissible equipment inby the last open crosscut or on equipment in the return airways of any coal mine shall be permissible or intrinsically safe and such components shall be maintained in permissible or intrinsically safe condition.

[37 FR 15302, July 29, 1972]

30 CFR §75.1107-6

Capacity of fire suppression devices; location and direction of nozzles.

(a) Each fire suppression device shall be:

(1) Adequate in size and capacity to extinguish potential fires in or on the equipment protected; and

(2) Suitable for the atmospheric conditions surrounding the equipment protected (e.g., air velocity, type, and proximity of adjacent combustible material); and

(3) Rugged enough to withstand rough usage and vibration when installed on mining equipment.

(b) The extinguishant-discharge nozzles of each fire suppression device shall, where practicable, be located so as to take advantage of mine ventilation air currents. The fire suppression device may be of the internal injection, inundating, or combination type. Where fire control is achieved by internal injection, or combination of internal injection and inundation, hazardous locations shall be enclosed to minimize runoff and overshoot of the extinguishing agent and the extinguishing agent shall be directed onto:

(1) Cable reel compartments and electrical cables on the equipment which are subject to flexing or to external damage; and

(2) All hydraulic components on the equipment which are exposed directly to or located in the immediate vicinity of electrical cables which are subject to flexing or to damage.

[37 FR 15302, July 29, 1972]

30 CFR §75.1107-7

Water spray devices; capacity; water supply; minimum requirements.

(a) Where water spray devices are used on unattended underground equipment the rate of flow shall be at least 0.25 gallon per minute per square foot over the top surface area of

the equipment and the supply of water shall be adequate to provide the required flow of water for 10 minutes.

(b) Where water spray devices are used for inundating attended underground equipment the rate of flow shall be at least 0.18 gallon per minute per square foot over the top surface area of the equipment (excluding conveyors, cutters, and gathering heads), and the supply of water shall be adequate to provide the required flow of water for 10 minutes.

(c) Where water is used for internal injection on attended equipment the total quantity of water shall be at least 4.5 gallons times the number of hazardous locations; however, the total minimum amount of water shall not be less than the following:

Type of equipment	Water in gallons
(1) Cutting machines	36
(2) Continuous miners	36
(3) Haulage vehicles	22.5
(4) All other attended equipment	18.0

The rate of flow shall be not less than 7 gallons per minute.

(d) Where water is used in a combination internal injection and inundation system on attended equipment the rate of flow shall be at least 0.12 gallon per minute per square foot over the top surface area of the equipment (excluding conveyors, cutters, and gathering heads), and the supply of water shall be adequate to provide the required flow of water for 10 minutes.

(e) On equipment provided with a cable reel and an internal injection or combination-type system, the amount of water discharged into the cable reel compartments shall be approximately 25 percent of the amount required to be discharged by the system, however, such quantity need not exceed 10 gallons.

(f) Liquid chemicals may be used, as approved by the Secretary in self-contained fire suppression devices. Such liquid chemicals shall be nontoxic and when applied to a fire shall not produce excessive toxic compounds. The quantity of liquid chemicals required shall be proportionately less than water as based on equivalency ratings established by the Secretary or equivalency ratings made by a nationally recognized agency approved by the Secretary.

[37 FR 15302, July 29, 1972]

30 CFR §75.1107-8

Fire suppression devices; extinguishant supply systems.

(a) Fire suppression systems using water or liquid chemical to protect attended equipment shall:

(1) Be maintained at a pressure consistent with the pipe, fittings, valves, and nozzles used in the system.

(2) Be located so as to be protected against damage during operation of the equipment protected.

(3) Employ liquid which is free from excessive sediment and noncorrosive to the system.

(4) Include strainers equipped with flush-out connections or equivalent protective devices and a rising stem or other visual indicator-type shutoff valve.

(b) Water supplies for fire suppression devices installed on underground equipment may be maintained in mounted water tanks or by connection to water mains. Such water supplies shall be continuously connected to the fire suppression device whenever the equipment is connected to a power source, except for a reasonable time for changing hose connections to hydrants while the machine is stopped in a ventilated passageway.

[37 FR 15302, July 29, 1972]

30 CFR §75.1107-9

Dry chemical devices; capacity; minimum requirements.

(a) Dry chemical fire extinguishing systems used on underground equipment shall be of the multipurpose powder-type and shall include the following:

(1) The system including all hose and nozzles shall be protected against the entrance of moisture, dust, or dirt;

(2) The system shall be guarded against damage during operation of the equipment protected;

(3) Hose and pipe shall be as short as possible; the distance between the chemical container and furthest nozzle shall not exceed 50 feet;

(4) Hose, piping, and fittings between the actuator and the chemical container shall have a bursting pressure of 500 pounds per square inch (gage) or higher; the hose, piping, and fittings between the chemical container and the nozzles shall have a bursting pressure of 300 pounds per square inch (gage) or higher and

(5) The system shall discharge in 1 minute or less, for quantities less than 50 pounds (nominal) [1] and in less than 2 minutes for quantities more than 50 pounds;

Many dry chemical systems were originally designed for sodium bicarbonate before all-purpose chemical (ammonium phosphate) was shown to be more effective. Sodium

bicarbonate is denser than ammonium phosphate; hence, for example, a 50-pound system designed for the sodium bicarbonate will hold slightly more by weight than all-purpose dry chemical (ammonium phosphate) by weight. The word “nominal” is used in §75.1107-9 to express the approximate weight in pounds of all-purpose dry chemical.

(b) On unattended underground equipment, the number of pounds of dry chemical employed by the system shall be not less than 1 pound per square foot of top surface area of the equipment; however, the minimum amount in any system shall be 20 pounds (nominal). The discharge shall be directed into and on potentially hazardous locations of the equipment.

(c) On attended underground equipment, the number of pounds (nominal) employed by the system shall equal 5 times the total number of hazardous locations; however, the minimum amount in any system shall not be less than the following, except that systems on haulage vehicles installed prior to the effective date of this section may contain 20 pounds (nominal).

Type of equipment	Dry chemical pounds (nominal)
(1) Cutting machines	40
(2) Continuous miners	40
(3) Haulage vehicles	30
(4) All other attended equipment	20

(d) The amount of dry chemical discharged into the cable reel compartments of attended underground equipment shall be approximately 25 percent of the total amount required to be discharged by the system; however, the quantity discharged into cable reel compartments need not exceed 10 pounds.

[37 FR 15302, July 29, 1972]

30 CFR §75.1107-10

High expansion foam devices; minimum capacity.

(a) On unattended underground equipment the amount of water delivered as high expansion foam for a period of approximately 20 minutes shall be not less than 0.06 gallon per minute per square foot of surface area of the equipment protected; however, the minimum total rate for any system shall be not less than 3 gallons per minute.

(b) On attended underground equipment, foam may be delivered by internal injection, inundation, or combination-type systems. Each system shall deliver water as foam for a minimum of 10 minutes. For internal injection, the rate of water application as high expansion foam shall be not less than 0.5 gallon per minute per hazardous location; however, the minimum total rate shall be not less than 2 gallons per minute. For inundation, the rate of water application as high expansion foam shall be not less than 1.5 gallon per minute per square foot of top surface area of the equipment protected; however, the minimum total rate shall be not less than 5 gallons of water per minute.

(c) In combined internal injection and inundation systems the rate of water applied as foam shall not be less than 0.035 gallon per minute per square foot of top surface area of the equipment protected; however, the minimum total rate shall not be less than 3.5 gallons of water per minute.

(d) Where internal injection is employed, the amount of water discharged as high expansion foam into the cable reel compartments of underground equipment regularly operated by a miner shall be approximately 25 percent of the total amount required to be discharged by the system; however, the quantity of water discharged as foam into the cable reel compartment need not exceed 1.5 gallons.

[37 FR 15303, July 29, 1972]

30 CFR §75.1107-11

Extinguishing agents; requirements on mining equipment employed in low coal.

On mining equipment no more than 32 inches high, the quantity of extinguishing agent required under the provisions of §§75.1107-7, 75.1107-9, and 75.1107-10 may be reduced by one-fourth if space limitations on the equipment require such reduction.

[37 FR 15303, July 29, 1972]

30 CFR §75.1107-12

Inerting of mine atmosphere prohibited.

No fire suppression device designed to control fire by total flooding shall be installed to protect unattended underground equipment except in enclosed dead-end entries or enclosed rooms.

[37 FR 15303, July 29, 1972]

30 CFR §75.1107-13

Approval of other fire suppression devices.

Notwithstanding the provisions of §§75.1107-1 through 75.1107-12 the District Manager for the District in which the mine is located may approve any other fire suppression system or device which provides substantially equivalent protection as would be achieved through compliance with those sections: *Provided,* that no such system or device shall be approved which does not meet the following minimum criteria:

(a) Components shall be approved by the Secretary, or where appropriate be listed as approved by a nationally recognized agency approved by the Secretary.

(b) The fire suppression equipment shall be designed to withstand the rigors of the mine environment. Where used, pressure vessels shall conform with the requirements of section 3603, 3606, 3607, 3707, and 3708 of National Fire Code No. 22 "Water Tanks for Private Fire Protection" (NFPA No. 22-1971).

(c) The cover of hose of fire suppression devices, if used on the protected equipment, shall meet the flame-resistant requirements of Part 18 of this chapter (Bureau of Mines Schedule 2G).

(d) Extinguishing agents shall not create a serious toxic or other hazard to the miners.

(e) The electrical components of the fire suppression device shall meet the requirements for electrical components of the mining machine.

(f) Where used, manual actuators for initiating the operation of the fire suppression device shall be readily accessible to the machine operator. On unattended equipment, an automatic as well as a manual actuator shall be provided.

(g) On unattended equipment the fire suppression device shall operate independently of the power to the main motor (or equivalent) so it will remain operative if the circuit breakers (or other protective device) actuates. On attended equipment powered through a trailing cable the fire suppression device shall operate independently of the electrical power provided by the cable.

(h) On unattended equipment, the sensor system shall have a means for checking its operative condition.

(i) The fire suppression agent shall be directed at locations where the greatest potential fire hazard exists. Cable reel compartments shall receive approximately twice the quantity of extinguishing agent as each other hazardous location.

(j) The rate of application of the fire suppression agent shall minimize the time for quenching and the total quantity applied shall be sufficient to quench a fire in its incipient stage.

(k) The effectiveness of the quenching agent, together with the total quantity of agent and its rate of application shall provide equivalent protection to the water, dry powder, or foam systems described in §§75.1107-7, 75.1107-9, and 75.1107-10.

(l) The fire suppression device shall be operable at all times electrical power is connected to the mining machine, except during tramming when the machine is in a ventilated passageway, the water hose if used, may be switched from one hydrant to another in a reasonable time and except in systems meeting the minimum special criteria set forth in paragraph (m) of this section.

(m) Systems for attended equipment which are not continuously connected to a water supply shall not be approved unless they meet the following minimum criteria:

(1) The machine shall be equipped with a firehose at least 50 feet in length which is continuously connected to the machine-mounted portion of the system.

(2) Hydrants in proximity to the area where the machine is to be used shall be equipped with sufficient hose to reach the machine at any time it is connected to a power source.

(3) The machine shall be used only where the operator (or other person) will always be in ventilated air uncontaminated by smoke and hot gases from the machine fire while extending the machine-mounted hose to connect with the hydrant-mounted hose.

(4) The machine and hydrant hoses shall be readily accessible so that the connection between the machine-mounted hose and the hydrant hose can be made and water flow achieved in not more than 3 minutes under actual mining conditions for any location of the machine while electric power is connected.

(5) The rate of water flow at the machine shall provide a minimum of 0.12 gallon of water per minute per square foot of top surface area (excluding conveyors, cutters, and gathering heads). The water shall discharge to all hazardous locations on the machine.

(6) Hose, if used on the machine, in addition to meeting the flame resistant requirements for the cover of a hose provided in §§75.1107-3(b) and 75.1107-13(c) shall have a minimum burst pressure 4 times that of the static water pressure at the mining machine. Fabric braid hose shall have at least two braids, and wire braid hose shall have at least a single braid.

(7) In addition to the hose located at the hydrant (which is intended to be connected to the hose on the machine) the firefighting equipment required by §75.1100-2(a) shall be maintained.

(8) A sufficient number of trained miners shall be kept on the section when the machine is in use to connect the machine hose to the hydrant hose and achieve water flow in not more than 3 minutes.

[37 FR 15303, July 29, 1972]

30 CFR §75.1107-14

Guards and handrails; requirements where fire suppression devices are employed.

All unattended underground equipment provided with fire suppression devices which are mounted in dead end entries, enclosed rooms or other potentially hazardous locations shall be equipped with adequate guards at moving or rotating components. Handrails or other effective protective devices shall be installed at such locations where necessary to facilitate rapid egress from the area surrounding such equipment.

30 CFR §75.1107-15

Fire suppression devices; hazards; training of miners.

Each operator shall instruct all miners normally assigned to the active workings of the mine with respect to any hazards inherent in the operation of all fire suppression devices installed in accordance with §75.1107-1 and, where appropriate, the safeguards available at each such installation.
[37 FR 15303, July 29, 1972]

30 CFR §75.1107-16

Inspection of fire suppression devices.

(a) All fire suppression devices shall be visually inspected at least once each week by a person qualified to make such inspections.

(b) Each fire suppression device shall be tested and maintained in accordance with the requirements specified in the appropriate National Fire Code listed as follows for the type and kind of device used:

National Fire Code No. 11A "High Expansion Foam Systems" (NFPA No. 11A - 1970).
National Fire Code No. 13A "Care and Maintenance of Sprinkler Systems" (NFPA No. 13A - 1971).
National Fire Code No. 15 "Water Spray Fixed Systems for Fire Protection" (NFPA No. 15 - 1969).
National Fire Code No. 17 "Dry Chemical Extinguishing Systems" (NFPA No. 17 - 1969).
National Fire Code No. 72A "Local Protective Signaling Systems" (NFPA No. 72A - 1967).
National Fire Code No. 198 "Care of Fire Hose" (NFPA No. 198 - 1969).

(c) A record of the inspections required by this section shall be maintained by the operator. The record of the weekly inspections may be maintained at an appropriate location by each fire suppression device.

[37 FR 15304, July 29, 1972, as amended at 60 FR 33723, June 29, 1995]

30 CFR §75.1107-17

Incorporation by reference; availability of publications.

In accordance with 5 U.S.C. 552(a), the technical publications to which reference is made in §§75.1107-1 through 75.1107-16, and which have been prepared by organizations other than the Bureau of Mines or the Mine Safety and Health Administration, are hereby incorporated by reference and made a part hereof. The incorporated publications are available for examination at each MSHA Coal Mine Safety and Health district office. National Fire Codes are available from the National Fire Protection Association, 11 Tracy Drive, Avon, MA 02322; Telephone: 800-344-3555 (toll free); *http://www.nfpa.org.*

[37 FR 15304, July 29, 1972, as amended at 71 FR 16669, Apr. 3, 2006]

30 CFR §75.1108

Flame-resistant conveyor belts.

On and after March 30, 1970, all conveyor belts acquired for use underground shall meet the requirements to be established by the Secretary for flame-resistant conveyor belts.

30 CFR §75.1108-1

Approved conveyor belts.

Conveyor belts which have been approved as flame-resistant by the Bureau of Mines under Part 18 of this chapter (Bureau of Mines Schedule 2G) meet the requirements of §75.1108.

Subpart M-Maps

30 CFR §75.1200

Mine map.

The operator of a coal mine shall have in a fireproof repository located in an area on the surface of the mine chosen by the mine operator to minimize the danger of destruction by fire or other hazard, an accurate and up-to-date map of such mine drawn on scale. Such map shall show:

(a) The active workings;

(b) All pillared, worked out, and abandoned areas, except as provided in this section;

(c) Entries and aircourses with the direction of airflow indicated by arrows;

(d) Contour lines of all elevations;

(e) Elevations of all main and cross or side entries;

(f) Dip of the coalbed;

(g) Escapeways;

(h) Adjacent mine workings within 1,000 feet;

(i) Mines above or below;

(j) Water pools above; and

(k) Either producing or abandoned oil and gas wells located within 500 feet of such mine and any underground area of such mine; and,

(l) Such other information as the Secretary may require. Such map shall identify those areas of the mine which have been pillared, worked out, or abandoned, which are inaccessible or cannot be entered safely and on which no information is available.

30 CFR §75.1200-1

Additional information on mine map.

Additional information required to be shown on mine maps under §75.1200 shall include the following:

(a) Name and address of the mine;

(b) The scale and orientation of the map;

(c) The property or boundary lines of the mine;

(d) All drill holes that penetrate the coalbed being mined;

(e) All shaft, slope, drift, and tunnel openings and auger and strip mined areas of the coalbed being mined;

(f) The location of all surface mine ventilation fans; the location may be designated on the mine map by symbols;

(g) The location of railroad tracks and public highways leading to the mine, and mine buildings of a permanent nature with identifying names shown;

(h) The location and description of at least two permanent base line points coordinated with the underground and surface mine traverses, and the location and description of at least two permanent elevation bench marks used in connection with establishing or referencing mine elevation surveys;

(i) The location of any body of water dammed in the mine or held back in any portion of the mine; provided, however, such bodies of water may be shown on overlays or tracings attached to the mine maps used to show contour lines as provided under paragraph (m) of this section;

(j) The elevations of tops and bottoms of shafts and slopes, and the floor at the entrance to drift and tunnel openings;

(k) The elevation of the floor at intervals of not more than 200 feet in:

(1) At least one entry of each working section, and main and cross entries;

(2) The last line of open crosscuts of each working section, and main and cross entries before such sections and main and cross entries are abandoned;

(3) Rooms advancing toward or adjacent to property or boundary lines or adjacent mines;

(l) The elevation of any body of water dammed in the mine or held back in any portion of the mine; and,

(m) Contour lines passing through whole number elevations of the coalbed being mined. The spacing of such lines shall not exceed 10-foot elevation levels, except that a broader spacing of contour lines may be approved by the District Manager for steeply-pitching coalbeds. Contour lines may be placed on overlays or tracings attached to mine maps.

(n) The locations of refuge alternatives.

[35 FR 17890, Nov. 20, 1970, as amended at 73 FR 80697, Dec. 31, 2008]

30 CFR §75.1200-2

Accuracy and scale of mine maps.

(a) The scale of mine maps submitted to the Secretary shall not be less than 100 or more than 500 feet to the inch.

(b) Mine traverses shall be advanced by closed loop methods of traversing or other equally accurate methods of traversing.

30 CFR §75.1201

Certification.

Such map shall be made or certified by a registered engineer or a registered surveyor of the State in which the mine is located.

30 CFR §75.1202

Temporary notations, revisions, and supplements.

Such map shall be kept up-to-date by temporary notations and such map shall be revised and supplemented at intervals prescribed by the Secretary on the basis of a survey made or certified by such engineer or surveyor.

30 CFR §75.1202-1

Temporary notations, revisions, and supplements.

(a) Mine maps shall be revised and supplemented at intervals of not more than 6 months.

(b) Temporary notations shall include:

(1) The location of each working face of each working place;

(2) Pillars mined or other such second mining;

(3) Permanent ventilation controls constructed or removed, such as seals, overcasts, undercasts, regulators, and permanent stoppings, and the direction of air currents indicated;

(4) Escapeways and refuge alternatives designated by means of symbols.

[35 FR 17890, Nov. 20, 1970, as amended at 73 FR 80697, Dec. 31, 2008]

30 CFR §75.1203

Availability of mine map.

The coal mine map and any revision and supplement thereof shall be available for inspection by the Secretary or his authorized representative, by coal mine inspectors of the State in which the mine is located, by miners in the mine and their representatives and by operators of adjacent coal mines and by persons owning, leasing, or residing on surface areas of such mines or areas adjacent to such mines. The operator shall furnish to the Secretary or his authorized representative and to the Secretary of Housing and Urban Development, upon request, one or more copies of such maps and any revision and supplement thereof. Such map or revision and supplement thereof shall be kept confidential and its contents shall not be divulged to any other person, except to the extent necessary to carry out the provisions of this Act and in connection with the functions and responsibilities of the Secretary of Housing and Urban Development.

30 CFR §75.1204

Mine closure; filing of map with Secretary.

Whenever an operator permanently closes or abandons a coal mine, or temporarily closes a coal mine for a period of more than 90 days, he shall promptly notify the Secretary of such closure. Within 60 days of the permanent closure or abandonment of the mine, or, when the mine is temporarily closed, upon the expiration of a period of 90 days from the date of closure, the operator shall file with the Secretary a copy of the mine map revised and supplemented to the date of the closure. Such copy of the mine map shall be certified by a registered surveyor or registered engineer of the State in which the mine is located and shall be available for public inspection.

[47 FR 14696, Apr. 6, 1982; 60 FR 33719, June 29, 1995]

30 CFR §75.1204-1

Places to give notice and file maps.

Operators shall give notice of mine closures and file copies of maps with the Coal Mine Safety and Health District Office for the district in which the mine is located.

[35 FR 17890, Nov. 20, 1970, as amended at 60 FR 33723, June 29, 1995; 71 FR 16669, Apr. 3, 2006]

Subpart N--Explosives and Blasting

30 CFR §75.1300

Definitions.

The following definitions apply in this subpart.

Approval. A document issued by MSHA which states that an explosive or explosive unit has met the requirements of this part and which authorizes an approval marking identifying the explosive or explosive unit as approved as permissible.

Battery starting. The use of unconfined explosives to start the flow of coal down a breast or chute in an anthracite mine.

Blasting off the solid. Blasting the working face without providing a second free face by cutting, shearing or other method before blasting.

Instantaneous detonator. An electric detonator that fires within 6 milliseconds after application of the firing current.

Laminated partition. A partition composed of the following material and minimum nominal dimensions: 1/2-inch thick plywood, 1/2-inch thick gypsum wall board, 1/8-inch thick low carbon steel and 1/4-inch thick plywood, bonded together in that order.

Opener hole. The first hole or holes fired in a round blasted off the solid to create an additional free face.

Permissible blasting unit. A device that has been approved by MSHA and that is used for firing electric detonators.

Permissible explosive. Any substance, compound or mixture which is approved by MSHA and whose primary purpose is to function by explosion.

Round. A group of boreholes fired or intended to be fired in a continuous sequence with one application of the firing current.

Sheathed explosive unit. A device consisting of an approved or permissible explosive covered by a sheath encased in a sealed covering and designed to be fired outside the confines of a borehole.

Short-delay electric detonator. An electric detonator with a designated delay period of 25 to 1,000 milliseconds

30 CFR §75.1301

Qualified person.

(a) A qualified person under this subpart is a person who--

(1) Is certified or qualified to use explosives by the State in which the mine is located provided that the State requires a demonstration of ability to safely use permissible explosives as prescribed by this subpart effective January 17, 1989; or

(2) In States that do not certify or qualify persons to use explosives required by this section, has at least 1 year of experience working in an underground coal mine that includes direct involvement with procedures for handling, loading, and preparing explosives for blasting and demonstrates to an authorized representative of the Secretary the ability to use permissible explosives safely.

(b) Persons qualified or certified by a State to use permissible explosives in underground coal mines as of May 17, 1989, are considered qualified under this section even though their State program did not contain a demonstration of ability requirement.

[35 FR 17890, Nov. 20, 1970, as amended at 56 FR 51616, Oct. 11, 1991; 60 FR 33719, June 29, 1995]

30 CFR §75.1310

Explosives and blasting equipment.

(a) Only permissible explosives, approved sheathed explosive units, and permissible blasting units shall be taken or used underground.

(b) Black blasting powder, aluminum-cased detonators, aluminum-alloy-cased detonators, detonators with aluminum leg wires, and safety fuses shall not be taken or used underground.

(c) Explosives shall be fired only with a permissible blasting unit used in a manner consistent with its approval. Blasting units approved by MSHA that have approval labels specifying use with short-delay detonators with delay periods between 25-500 milliseconds are accepted to fire short-delay detonators up to 1,000 milliseconds, instantaneous detonators and long period delay detonators for anthracite mines.

(d) Permissible explosives and sheathed explosive units shall not be used underground when they are below the minimum product firing temperature specified by the approval. Explosives previously approved which do not specify a minimum firing temperature are permissible for use so long as the present approval is maintained.

(e) Electric detonators shall be compatible with the blasting unit and have sufficient strength to initiate the explosives being used.

30 CFR §75.1311

Transporting explosives and detonators.

(a) When explosives and detonators are to be transported underground -

(1) They shall be enclosed in separate, substantially constructed containers made of nonconductive material, with no metal or other conductive materials exposed inside, except as specified in paragraph (d) of this section; and

(2) Each container of explosives and of detonators shall be indelibly marked with a readily visible warning identifying the contents.

(b) When explosives and detonators are transported by any cars or vehicles -

(1) The cars or vehicles shall be marked with warnings to identify the contents as explosive. The warnings shall be readily visible to miners approaching from any direction and in indelible letters;

(2) Explosives and detonators shall be transported either in separate cars or vehicles, or if in the same cars or vehicles as follows:

(i) Class A and Class C detonators in quantities greater than 1,000 shall be kept in the original containers as shipped from the manufacturer and separated from explosives by a hardwood partition at least 4 inches thick, a laminated partition or equivalent; and

(ii) Class A and Class C detonators in quantities of no more than 1,000 shall be separated from explosives by a hardwood partition at least 4 inches thick, a laminated partition or equivalent.

(3) No persons, other than those necessary to operate the equipment or to accompany the explosives and detonators, shall be transported with explosives and detonators, and

(4) When explosives and detonators are transported using trolley locomotives -

(i) Trips carrying explosives and detonators shall be separated from all other mantrips by at least a 5-minute interval; and

(ii) Cars containing explosives or detonators shall be separated from the locomotives by at least one car that is empty or that contains noncombustible materials.

(c) When explosives and detonators are transported on conveyor belts -

(1) Containers of explosives shall be separated from containers of detonators by at least 50 feet;

(2) At least 6 inches of clearance shall be maintained between the top of any container of explosives or container of detonators and the mine roof or other obstruction;

(3) Except when persons are riding the belt to accompany explosives or detonators, a person shall be at each transfer point between belts and at the unloading location; and

(4) Conveyor belts shall be stopped before explosives or detonators are loaded or unloaded.

(d) When explosives and detonators are transported by hand they shall be carried in separate, nonconductive, closed containers.

30 CFR §75.1312

Explosives and detonators in underground magazines.

(a) The quantity of explosives kept underground shall not be more than is needed for 48 hours of use.

(b) Except as provided in §75.1313, explosives and detonators taken underground shall be kept in--

(1) Separate, closed magazines at least 5 feet apart; or

(2) The same closed magazine when--

(i) Separated by a hardwood partition at least 4 inches thick; or

(ii) Separated by a laminated partition; or

(iii) Separated by a device that is equivalent.

(c) Only explosives and detonators shall be kept in underground magazines.

(d) Magazines shall be substantially constructed and all interior surfaces shall be made of nonconductive material, with no metal or other conductive material exposed inside.

(e) All magazines shall be--

(1) Located at least 25 feet from roadways and any source of electric current;

(2) Located out of the direct line of the forces from blasting; and

(3) Kept as dry as practicable.

(f) Magazine locations shall be posted with indelibly marked and readily visible warnings indicating the presence of explosives.

(g) Only materials and equipment to be used in blasting shall be stored at magazine locations.

30 CFR §75.1313

Explosives and detonators outside of magazines.

(a) The quantity of explosives outside a magazine for use in a working section or other

area where blasting is to be performed shall--

(1) Not exceed 100 pounds; or

(2) Not exceed the amount necessary to blast one round when more than 100 pounds of explosives is required.

(b) Explosives and detonators outside a magazine that are not being transported or prepared for loading boreholes shall be kept in closed separate containers made of nonconductive material with no metal or other conductive material exposed inside and the containers shall be--

(1) At least 15 feet from any source of electric current;

(2) Out of the direct line of the forces from blasting;

(3) In a location to prevent damage by mobile equipment; and

(4) Kept as dry as practicable.

(c) Explosives and detonators not used during the shift shall be returned to a magazine by the end of the shift.

30 CFR §75.1314

Sheathed explosive units.

(a) A separate instantaneous detonator shall be used to fire each sheathed explosive unit.

(b) Sheathed explosive units shall be primed and placed in position for firing only by a qualified person or a person working in the presence of and under the direction of a qualified person. To prime a sheathed explosive unit, the entire detonator shall be inserted into the detonator well of the unit and be held securely in place.

(c) Sheathed explosive units shall not be primed until immediately before the units are placed where they are to be fired. A sheathed explosive unit shall not be primed if it is damaged or deteriorated.

(d) Except in anthracite mines, rock dust shall be applied to the roof, ribs and floor within a 40-foot radius of the location where the sheathed explosive units are to be fired.

(e) No more than three sheathed explosive units shall be fired at one time.

(f) No sheathed explosive unit shall be fired in contact with another sheathed explosive unit.

30 CFR §75.1315

Boreholes for explosives.

(a) All explosives fired underground shall be confined in boreholes except

(1) Sheathed explosives units and other explosive units approved by MSHA for firing outside the confines of a borehole; and

(2) Shots fired in anthracite mines for battery starting or for blasting coal overhangs. No person shall go inside a battery to start the flow of material.

(b) Each borehole in coal for explosives shall be at least 24 inches from any other borehole and from any free face, unless prohibited by the thickness of the coal seam.

(c) Each borehole in rock for explosives shall be at least 18 inches from any other borehole in rock, at least 24 inches from any other borehole in coal, and at least 18 inches from any free face.

(d) No borehole that has contained explosives shall be used for starting any other hole.

(e) When blasting slab rounds off the solid, opener holes shall not be drilled beyond the rib line.

(f) When coal is cut for blasting, the coal shall be supported if necessary to maintain the stability of the column of explosives in each borehole.

30 CFR §75.1316

Preparation before blasting.

(a)(1) All nonbattery-powered electric equipment, including cables, located within 50 feet from boreholes to be loaded with explosives or the sites where sheathed explosive units are to be placed and fired shall be de-energized or removed to at least 50 feet from these locations before priming of explosives. Battery-powered equipment shall be removed to at least 50 feet from these locations before priming of explosives.

(2) As an alternative to paragraph (a)(1) of this section, electric equipment, including cables, need not be de-energized or removed if located at least 25 feet from these locations provided stray current tests conducted prior to priming the explosives detect stray currents of 0.05 ampere or less through a 1-ohm resistor.

(i) Tests shall be made at floor locations on the perimeter, on energized equipment frames and on repaired areas of energized cables within the area between 25 to 50 feet from the locations where the explosives are to be primed.

(ii) Tests shall be conducted using a blasting multimeter or other instrument

specifically designed for such use.

(3) The blasting cable or detonator circuitry shall not come in contact with energized electric equipment, including cables.

(b) Before loading boreholes with explosives, each borehole shall be cleared and its depth and direction determined.

(c) No borehole drilled beyond the depth of cut coal shall be loaded with explosives unless that portion of the borehole deeper than the cut is tamped with noncombustible material.

(d) When two working faces are approaching each other, cutting, drilling and blasting shall be done at only one working face at a time if the two faces are within 25 feet of each other.

[35 FR 17890, Nov. 20, 1970, as amended at 56 FR 51616, Oct. 11, 1991]

30 CFR §75.1317

Primer cartridges.

(a) Primer cartridges shall be primed and loaded only by a qualified person or a person working in the presence of and under the direction of a qualified person.

(b) Primer cartridges shall not be primed until immediately before loading boreholes.

(c) Only a nonsparking punch shall be used when priming explosive cartridges.

(d) Detonators shall be completely within and parallel to the length of the cartridge and shall be secured by half-hitching the leg wires around the cartridge or secured by an equally effective method.

30 CFR §75.1318

Loading boreholes.

(a) Explosives shall be loaded by a qualified person or a person working in the presence of and under the direction of a qualified person.

(b) When boreholes are being loaded, no other work except that necessary to protect persons shall be done in the working place or other area where blasting is to be performed.

(c) When loading boreholes drilled at an angle of 45 degrees or greater from the horizontal in solid rock or loading long holes drilled upward in anthracite mines--

(1) The first cartridge in each borehole shall be the primer cartridge with the end of

the cartridge containing the detonator facing the back of the borehole; and

(2) The explosive cartridges shall be loaded in a manner that provides contact between each cartridge in the borehole.

(d) When loading other boreholes--

(1) The primer cartridge shall be the first cartridge loaded in the borehole;

(2) The end of the cartridge in which the detonator is inserted shall face the back of the borehole; and

(3) The primer cartridge and other explosives shall be pushed to the back of the borehole in a continuous column with no cartridge being deliberately crushed or deformed.

(e) An explosive shall not be loaded into a borehole if it is damaged, deteriorated or if the cartridge is incompletely filled.

(f) Explosives of different brands, types or cartridge diameters shall not be loaded in the same borehole.

(g) Only nonconductive, nonsparking tamping poles shall be used for loading and tamping boreholes. The use of nonsparking connecting devices for extendable tamping poles is permitted.

[53 FR 46786, Nov. 18, 1988; 54 FR 888, Jan. 10, 1989]

30 CFR §75.1319

Weight of explosives permitted in boreholes in bituminous and lignite mines.

(a) The total weight of explosives loaded in any borehole in bituminous and lignite mines shall not exceed 3 pounds except when blasting solid rock in its natural deposit.

(b) The total weight of explosives loaded in a borehole less than 6 feet deep in bituminous and lignite mines shall be reduced by 1/2 pound for each foot of borehole less than 6 feet.

30 CFR §75.1320

Multiple-shot blasting.

(a) No more than 20 boreholes shall be fired in a round unless permitted in writing by the District Manager under §75.1321.

(b) Instantaneous detonators shall not be used in the same circuit with delay detonators in any underground coal mine.

(c) In bituminous and lignite mines, only detonators with delay periods of 1,000 milliseconds or less shall be used.

(d) When blasting in anthracite mines, each borehole in a round shall be initiated in sequence from the opener hole or holes.

(e) Arrangement of detonator delay periods for bituminous and lignite mines shall be as follows:

(1) When blasting cut coal--

(i) The first shot or shots fired in a round shall be initiated in the row nearest the kerf or the row or rows nearest the shear; and

(ii) After the first shot or shots, the interval between the designated delay periods of successive shots shall be at least 50 milliseconds but not more than 100 milliseconds.

(2) When blasting coal off the solid--

(i) Each shot in the round shall be initiated in sequence from the opener hole or holes; and

(ii) After the first shot or shots, the interval between the designated delay periods of successive shots shall be at least 50 milliseconds but not more than 100 milliseconds.

30 CFR §75.1321

Permits for firing more than 20 boreholes and for use of nonpermissible blasting units.

(a) Applications for permits for firing more than 20 boreholes in a round and for the use of nonpermissible blasting units shall be submitted in writing to the District Manager for the district in which the mine is located and shall contain the following information:

(1) The name and address of the mine;

(2) The active workings in the mine affected by the permit and the approximate number of boreholes to be fired;

(3) The period of time during which the permit will apply;

(4) The nature of the development or construction for which they will be used, e.g., overcasts, undercasts, track grading, roof brushing or boom holes;

(5) A plan, proposed by the operator designed to protect miners in the mine from the hazards of methane and other explosive gases during each multiple shot, e.g., changes in the mine ventilation system, provisions for auxiliary ventilation and any other

safeguards necessary to minimize such hazards;

(6) A statement of the specific hazards anticipated by the operator in blasting for overcasts, undercasts, track grading, brushing of roof, boom holes or other unusual blasting situations such as coalbeds of abnormal thickness; and

(7) The method to be employed to avoid the dangers anticipated during development or construction which will ensure the protection of life and the prevention of injuries to the miners exposed to such underground blasting.

(b) The District Manager may permit the firing of more than 20 boreholes of permissible explosives in a round where he has determined that it is necessary to reduce the overall hazard to which miners are exposed during underground blasting. He may also permit the use of nonpermissible blasting units if he finds that a permissible blasting unit does not have adequate blasting capacity and that the use of such permissible units will create any of the following development or construction hazards:

(1) Exposure to disturbed roof in an adjacent cavity while scaling and supporting the remaining roof prior to wiring a new series of boreholes;

(2) Exposure to underburden boreholes where prior rounds have removed the burden adjacent to a remaining borehole;

(3) Exposure to an unsupported roof while redrilling large fragmented roof rock following the loss of predrilled boreholes during earlier blasting operations; or

(4) Any other hazard created by the use of permissible blasting units during underground development or construction.

(c) Permits shall be issued on a mine-by-mine basis for periods of time to be specified by the District Manager.

(d) Permits issued under this section shall specify and include as a condition of their use, any safeguards, in addition to those proposed by the operator, which the District Manager issuing such permit has determined will be required to ensure the welfare of the miners employed in the mine at the time of the blasting permitted.

30 CFR §75.1322

Stemming boreholes

(a) Only noncombustible material shall be used for stemming boreholes.

(b) Stemming materials other than water stemming bags shall be tamped to fill the entire cross sectional area of the borehole.

(c) Stemming material shall contact the explosive cartridge nearest the collar of the

borehole.

(d) Each borehole 4 or more feet deep shall be stemmed for at least 24 inches.

(e) Each borehole less than 4 feet deep shall be stemmed for at least half the depth of the borehole.

(f) When blasting off the solid in bituminous and lignite mines, only pliable clay dummies shall be used for stemming.

(g) The diameter of a water stemming bag shall be within 1/4 of an inch of the diameter of the drill bit used to drill the borehole.

(h) Water stemming bags shall be constructed of tear-resistant and flame-resistant material and be capable of withstanding a 3-foot drop when filled without rupturing or developing leaks.

30 CFR §75.1323

Blasting circuits.

(a) Blasting circuits shall be protected from sources of stray electric current.

(b) Detonators made by different manufacturers shall not be combined in the same blasting circuit.

(c) Detonator leg wires shall be shunted until connected into the blasting circuit.

(d) Blasting cables shall be--

(1) Well insulated, copper wire of a diameter not smaller than 18-gauge; and

(2) Long enough to permit the round to be fired from a safe location that is around at least one corner from the blasting area.

(e) Blasting cables shall be shunted until immediately before firing, except when testing for circuit continuity.

(f) Wire used between the blasting cable and detonator circuitry shall--

(1) Be undamaged;

(2) Be well insulated;

(3) Have a resistance no greater than 20-gauge copper wire; and

(4) Be not more than 30 feet long.

(g) Each wire connection in a blasting circuit shall be--

(1) Properly spliced; and

(h) Separated from other connections in the circuit to prevent accidental contact and arcing.

(i) Uninsulated connections in each blasting circuit shall be kept out of water and shall not contact the coal, roof, ribs, or floor.

(j) When 20 or fewer boreholes are fired in a round, the blasting circuit shall be wired in a single series.

(k)Immediately prior to firing, all blasting circuits shall be tested for continuity and resistance using a blasting galvanometer or other instrument specifically designed for testing blasting circuits.

[53 FR 46786, Nov. 18, 1988; 54 FR 27641, June 30, 1989]

30 CFR §75.1324

Methane concentration and tests.

(a) No shot shall be fired in an area that contains 1.0 volume percent or more of methane.

(b) Immediately before shots are fired, the methane concentration in a working place or any other area where blasting is to be performed, shall be determined by a person qualified to test for methane.

30 CFR §75.1325

Firing procedures.

(a) Shots shall be fired by a qualified person or a person working in the presence of and under the direction of a qualified person.

(b) Only one face in a working place shall be blasted at a time, except that when blasting cut coal up to three faces may be blasted in a round if each face has a separate kerf and no more than a total of 20 shots connected in a single series are fired in the round. A permit to fire more than 20 boreholes in a round under the provisions of 30 CFR 75.1320 and 75.1321 may not be obtained for use when blasting multiple faces.

(c) Before blasting--

(1) All persons shall leave the blasting area and each immediately adjacent working place where a hazard would be created by the blast, to an area that is around at least one corner from the blasting area;

(2) The qualified person shall ascertain that all persons are a safe distance from the blasting area; and

(d) A warning shall be given and adequate time allowed for persons to respond.

(e) All shots shall be fired promptly, after all persons have been removed to a safe location.

[35 FR 17890, Nov. 20, 1970, as amended at 56 FR 51616, Oct. 11, 1991]

30 CFR §75.1326

Examination after blasting.

(a) After blasting, the blasting area shall not be entered until it is clear of smoke and dust.

(b) Immediately after the blasting area has cleared, a qualified person or a person working in the presence of and under the direction of a qualified person, shall examine the area for misfires, methane and other hazardous conditions.

(c) If a round has partially detonated, the qualified person shall immediately leave the area and no person shall reenter the affected area for at least 5 minutes.

30 CFR §75.1327

Misfires.

(a) When misfires occur, only work by a qualified person to dispose of misfires and other work necessary to protect persons shall be done in the affected area.

(b) When a misfire cannot be disposed of--

(1) A qualified person shall post each accessible entrance to the area affected by the hazard of the misfire with a warning at a conspicuous location to prohibit entry; and

(2) The misfire shall be immediately reported to mine management.

[53 FR 46786, Nov. 18, 1988; 54 FR 27641, June 30, 1989]

30 CFR §75.1328

Damaged or deteriorated explosives and detonators.

(a) Damaged explosives or detonators shall be—

(1) Placed in separate containers constructed of nonconductive and

nonsparking materials; and

(2) Removed from the mine or placed in a magazine and removed when the magazine is resupplied.

(b) Damaged detonators shall be shunted, if practicable, either before being removed from the mine or placed in a magazine.

(c) Deteriorated explosives and detonators shall be handled and disposed of in accordance with the instructions of the manufacturer.

Subpart O--Hoisting and Mantrips

30 CFR §75.1400

Hoisting equipment; general.

(a) Every hoist used to transport persons shall be equipped with overspeed, overwind, and automatic stop controls.

(b) Every hoist handling a platform, cage, or other device used to transport persons shall be equipped with brakes capable of stopping the fully loaded platform, cage, or other device.

(c) Cages, platforms, or other devices used to transport persons in shafts and slopes shall be equipped with safety catches or other no less effective devices approved by the Secretary that act quickly and effectively in an emergency. Such catches or devices shall be tested at least once every two months.

(d) Hoisting equipment, including automatic elevators, used to transport persons shall be examined daily.

(e) Where persons are transported into or out of a mine by a hoist, a qualified hoisting engineer shall be on duty while any person is underground. No such engineer, however, shall be required for automatically operated cages, platforms, or elevators.

[48 FR 53239, Nov. 25, 1983]

30 CFR §75.1400-1

Hoists; brakes, capability.

Brakes on hoists used to transport persons shall be capable of stopping and holding the fully loaded platform, cage, or other device at any point in the shaft, slope, or incline

30 CFR §75.1400-2

Hoists; tests of safety catches; records.

A record shall be made in a book of the tests, required by §75.1400, of the safety catches or other devices approved by the Secretary. Each entry shall be signed by the person making the tests and countersigned by a responsible official.

30 CFR §75.1400-3

Daily examination of hoisting equipment.

Hoists and elevators shall be examined daily and such examinations shall include, but not be limited to, the following:

(a) *Elevators.* A visual examination of the rope for wear, broken wires, and corrosion, especially at excessive strain points such as near the attachments and where the rope rests on sheaves;

(b) *Hoists and elevators.*

(1) An examination of the rope fastenings for defects;

(2) An examination of safety catches;

(3) An examination of the cages, platforms, elevators, or other devices for loose, missing or defective parts;

(4) An examination of the head sheaves to check for broken flanges, defective bearings, rope alignment, and proper lubrication; and

(5) An observation of the lining and all other equipment and appurtenances installed in the shaft.

[48 FR 53239, Nov. 25, 1983]

30 CFR §75.1400-4

Certifications and records of daily examinations.

At the completion of each daily examination required by §75.1400, the person making the examination shall certify, by signature and date, that the examination has been made. If any unsafe condition is found during the examinations required by §75.1400-3, the person conducting the examination shall make a record of the condition and the date. Certifications and records shall be retained for one year.

30 CFR §75.1401

Hoists; rated capacities; indicators.

Hoists shall have rated capacities consistent with the loads handled. An accurate and reliable indicator of the position of the cage, platform, skip, bucket, or cars shall be provided.

[48 FR 53239, Nov. 25, 1983]

30 CFR §75.1401-1

Hoists; indicators.

The indicator required by §75.1401 of this subpart shall be placed so that it is in clear view of the hoisting engineer and shall be checked daily to determine its accuracy.

[48 FR 53239, Nov. 25, 1983]

30 CFR §75.1402

Communication between shaft stations and hoist room.

There shall be at least two effective methods approved by the Secretary of signaling between each of the shaft stations and the hoist room, one of which shall be a telephone or speaking tube.

30 CFR §75.1402-1

Communication between shaft stations and hoist room.

One of the methods used to communicate between shaft stations and the hoist room shall give signals which can be heard by the hoisting engineer at all times while men are underground.

30 CFR §75.1402-2

Tests of signaling systems.

Signaling systems used for communication between shaft stations and the hoist room shall be tested daily.

30 CFR §75.1403

Other safeguards.

Other safeguards adequate, in the judgment of an authorized representative of the Secretary, to minimize hazards with respect to transportation of men and materials shall

be provided.

30 CFR §75.1403-1

General criteria.

(a) Sections 75.1403-2 through 75.1403-11 set out the criteria by which an authorized representative of the Secretary will be guided in requiring other safeguards on a mine-by-mine basis under §75.1403. Other safeguards may be required.

(b) The authorized representative of the Secretary shall in writing advise the operator of a specific safeguard which is required pursuant to §75.1403 and shall fix a time in which the operator shall provide and thereafter maintain such safeguard. If the safeguard is not provided within the time fixed and if it is not maintained thereafter, a notice shall be issued to the operator pursuant to section 104 of the Act.

(c) Nothing in the sections in the §75.1403 series in this Subpart O precludes the issuance of a withdrawal order because of imminent danger.

30 CFR §75.1403-2

Criteria--Hoists transporting materials; brakes.

Hoists and elevators used to transport materials should be equipped with brakes capable of stopping and holding the fully loaded platform, cage, skip, car, or other device at any point in the shaft, slope, or incline.

30 CFR §75.1403-3

Criteria--Drum clutch; cage construction.

(a) The clutch of a free-drum on a personnel hoist should be provided with a locking mechanism or interlocked with the brake to prevent accidental withdrawal of the clutch.

(b) Cages used for hoisting persons should be constructed with the sides enclosed to a height of at least six feet and should have gates, safety chains, or bars across the ends of the cage when persons are being hoisted or lowered.

(c) Self-dumping cages, platforms, or other devices used for transportation of persons should have a locking device to prevent tilting when persons are transported.

(d) An attendant should be on duty at the surface when persons are being hoisted or lowered at the beginning and end of each shift.

(e) Precautions should be taken to protect persons working in shaft sumps.

(f) Workers should wear safety belts while doing work in or over shafts.

[48 FR 53239, Nov. 25, 1983]

30 CFR §75.1403-4

Criteria--Automatic elevators.

(a) The doors of automatic elevators should be equipped with interlocking switches so arranged that the elevator car will be immovable while any door is opened or unlocked, and arranged so that such door or doors cannot be inadvertently opened when the elevator car is not at a landing.

(b) A "Stop" switch should be provided in the automatic elevator compartment that will permit the elevator to be stopped at any location in the shaft.

(c) A slack cable device should be used where appropriate on automatic elevators which will automatically shut-off the power and apply the brakes in the event the elevator is obstructed while descending.

(d) Each automatic elevator should be provided with a telephone or other effective communication system by which aid or assistance can be obtained promptly.

30 CFR §75.1403-5

Criteria--Belt conveyors.

(a) Positive-acting stop controls should be installed along all belt conveyors used to transport men, and such controls should be readily accessible and maintained so that the belt can be stopped or started at any location.

(b) Belt conveyors used for regularly scheduled mantrips should be stopped while men are loading or unloading.

(c) All belt conveyors used for the transportation of persons should have a minimum vertical clearance of 18 inches from the nearest overhead projection when measured from the edge of the belt and there should be at least 36 inches of side clearance where men board or leave such belt conveyors.

(d) When men are being transported on regularly scheduled mantrips on belt conveyors the belt speed should not exceed 300 feet per minute when the vertical clearance is less than 24 inches, and should not exceed 350 feet per minute when the vertical clearance is 24 inches or more.

(e) Adequate illumination including colored lights or reflective signs should be installed at all loading and unloading stations. Such colored lights and reflective signs should be so located as to be observable to all persons riding the belt conveyor.

(f) After supplies have been transported on belt conveyors such belts should be examined for unsafe conditions prior to the transportation of men on regularly scheduled mantrips,

and belt conveyors should be clear before men are transported.

(g) A clear travelway at least 24 inches wide should be provided on both sides of all belt conveyors installed after March 30, 1970. Where roof supports are installed within 24 inches of a belt conveyor, a clear travelway at least 24 inches wide should be provided on the side of such support farthest from the conveyor.

(h) On belt conveyors that do not transport men, stop and start controls should be installed at intervals not to exceed 1,000 feet. Such controls should be properly installed and positioned so as to be readily accessible.

(i) Telephone or other suitable communications should be provided at points where men or supplies are regularly loaded on or unloaded from the belt conveyors.

(j) Persons should not cross moving belt conveyors, except where suitable crossing facilities are provided.

30 CFR §75.1403-6

Criteria--Self-propelled personnel carriers.

(a) Each self-propelled personnel carrier should:

(1) Be provided with an audible warning device;

(2) Be provided with a sealed-beam headlight, or its equivalent, on each end;

(3) Be provided with reflectors on both ends and sides.

(b) In addition, each track-mounted self-propelled personnel carrier should:

(1) Be provided with a suitable lifting jack and bar, which shall be secured or carried in a tool compartment;

(2) Be equipped with 2 separate and independent braking systems properly installed and well maintained;

(3) Be equipped with properly installed and well-maintained sanding devices, except that personnel carriers (jitneys), which transport not more than 5 men, need not be equipped with such sanding device;

(4) If an open type, be equipped with guards of sufficient strength and height to prevent personnel from being thrown from such carriers.

30 CFR §75.1403-7

Criteria--Mantrips.

(a) Mantrips should be operated independently of any loaded trip, empty trip, or supply trip and should not be operated within 300 feet of any trip, including another mantrip.

(b) A sufficient number of mantrip cars should be provided to prevent overcrowding of men.

(c) Mantrips should not be pushed.

(d) Where mantrips are operated by locomotives on slopes such mantrips should be coupled to the front and rear by locomotives capable of holding such mantrips. Where ropes are used on slopes for mantrip haulage, such conveyances should be connected by chains, steel ropes, or other effective devices between mantrip cars and the rope.

(e) Safety goggles or eyeshields should be provided for all persons being transported in open-type mantrips.

(f) All trips, including trailers and sleds, should be operated at speeds consistent with conditions and the equipment used, and should be so controlled that they can be stopped within the limits of visibility.

(g) All mantrips should be under the direction of a supervisor and the operator of each mantrip should be familiar with the haulage safety rules and regulations.

(h) Men should proceed in an orderly manner to and from mantrips and no person should be permitted to get on or off a moving mantrip.

(i) [Reserved]

(j) Mantrips should not be permitted to proceed until the operator of the mantrip is assured that he has a clear road.

(k) Supplies or tools, except small hand tools or instruments, should not be transported with men.

(l) At places where men enter or leave mantrip conveyances, ample clearance should be provided and provisions made to prevent persons from coming in contact with energized electric circuits.

(m) The mine car next to a trolley locomotive should not be used to transport men. Such cars may be used to transport small tools and supplies. This is not to be construed as permitting the transportation of large or bulky supplies such as shuttle car wheel units, or similar material.

(n) Drop-bottom cars used to transport men should have the bottoms secured with an additional locking device.

(o) Extraneous materials or supplies should not be transported on top of equipment; however, materials and supplies that are necessary for or related to the operation of such equipment may be transported on top of such equipment if a hazard is not introduced.

[35 FR 17890, Nov. 20, 1970, as amended at 53 FR 46786, Nov. 18, 1988]

30 CFR §75.1403-8

Criteria--Track haulage roads.

(a) The speed at which haulage equipment is operated should be determined by the condition of the roadbed, rails, rail joints, switches, frogs, and other elements of the track and the type and condition of the haulage equipment.

(b) Track haulage roads should have a continuous clearance on one side of at least 24 inches from the farthest projection of normal traffic. Where it is necessary to change the side on which clearance is provided, 24 inches of clearance should be provided on both sides for a distance of not less than 100 feet and warning signs should be posted at such locations.

(c) Track haulage roads developed after March 30, 1970, should have clearance on the "tight" side of at least 12 inches from the farthest projection of normal traffic. A minimum clearance of 6 inches should be maintained on the "tight" side of all track haulage roads developed prior to March 30, 1970.

(d) The clearance space on all track haulage roads should be kept free of loose rock, supplies, and other loose materials.

(e) Positive stopblocks or derails should be installed on all tracks near the top and at landings of shafts, slopes, and surface inclines.

30 CFR §75.1403-9

Criteria--Shelter holes.

(a) Shelter holes should be provided on track haulage roads at intervals of not more than 105 feet unless otherwise approved by the Coal Mine Safety District Manager(s).

(b) Shelter holes should be readily accessible and should be at least 5 feet in depth, not more than 4 feet in width (except crosscuts used as shelter holes) and at least the height of the coal seam where the coal seam is less than 6 feet high and at least 6 feet in height where the coal seam is 6 feet or more in height.

(c) Shelter holes should be kept free of refuse and other obstructions. Crosscuts used as shelter holes should be kept free of refuse or other materials to a depth of at least 15 feet.

(d) Shelter holes should be provided at all manually operated doors and at switch throws except: (1) At room switches, or (2) at switches where more than 6 feet of side clearance is provided. The Coal Mine Safety District Manager(s) may permit exemption of this requirement if such shelter holes create a hazardous roof condition.

(e) At each underground slope landing where men pass and cars are handled, a shelter hole at least 10 feet in depth, 4 feet in width, and 6 feet in height should be provided.

30 CFR §75.1403-10

Criteria--Haulage; general.

(a) A permissible trip light or other approved device such as reflectors, approved by the Coal Mine Safety District Manager(s), should be used on the rear of trips pulled, on the front of trips pushed and on trips lowered in slopes. However, trip lights or other approved devices need not be used on cars being shifted to and from loading machines, on cars being handled at loading heads, during gathering operations at working faces, when trailing locomotives are used, or on trips pulled by animals.

(b) Cars on main haulage roads should not be pushed, except where necessary to push cars from side tracks located near the working section to the producing entries and rooms, where necessary to clear switches and sidetracks, and on the approach to cages, slopes, and surface inclines.

(c) Warning lights or reflective signs or tapes should be installed along haulage roads at locations of abrupt or sudden changes in the overhead clearance.

(d) No person, other than the motorman and brakeman, should ride on a locomotive unless authorized by the mine foreman, and then only when safe riding facilities are provided. No person should ride on any loaded car or on the bumper of any car. However, the brakeman may ride on the rear bumper of the last car of a slow moving trip pulled by a locomotive.

(e) Positive-acting stopblocks or derails should be used where necessary to protect persons from danger of runaway haulage equipment.

(f) An audible warning should be given by the operator of all self-propelled equipment including off-track equipment, where persons may be endangered by the movement of the equipment.

(g) Locomotives and personnel carriers should not approach to within 300 feet of preceding haulage equipment, except trailing locomotives that are an integral part of the trip.

(h) A total of at least 36 inches of unobstructed side clearance (both sides combined) should be provided for all rubber-tired haulage equipment where such equipment is used.

(i) Off-track haulage roadways should be maintained as free as practicable from bottom irregularities, debris, and wet or muddy conditions that affect the control of the equipment.

(j) Operators of self-propelled equipment should face in the direction of travel.

(k) Mechanical steering and control devices should be maintained so as to provide positive control at all times.

(l) All self-propelled rubber-tired haulage equipment should be equipped with well maintained brakes, lights, and a warning device.

(m) On and after March 30, 1971, all tram control switches on rubber-tired equipment should be designed to provide automatic return to the stop or off position when released.

30 CFR §75.1403-11

Criteria--Entrances to shafts and slopes.

All open entrances to shafts should be equipped with safety gates at the top and at each landing. Such gates should be self-closing and should be kept closed except when the cage is at such landing.

30 CFR §75.1404

Automatic brakes; speed reduction gear.

Each locomotive and haulage car used in an underground coal mine shall be equipped with automatic brakes, where space permits. Where space does not permit automatic brakes, locomotives and haulage cars shall be subject to speed reduction gear, or other similar devices approved by the Secretary, which are designed to stop the locomotives and haulage cars with the proper margin of safety.

30 CFR §75.1404-1

Braking system.

A locomotive equipped with a dual braking system will be deemed to satisfy the requirements of §75.1404 for a train comprised of such locomotive and haulage cars, provided the locomotive is operated within the limits of its design capabilities and at speeds consistent with the condition of the haulage road. A trailing locomotive or equivalent devices should be used on trains that are operated on ascending grades.

30 CFR §75.1405

Automatic couplers.

All haulage equipment acquired by an operator of a coal mine on or after March 30,

1971, shall be equipped with automatic couplers which couple by impact and uncouple without the necessity of persons going between the ends of such equipment. All haulage equipment without automatic couplers in use in a mine on March 30, 1970, shall also be so equipped within 4 years after March 30, 1970.

30 CFR §75.1405-1

Automatic couplers, haulage equipment.

The requirement of §75.1405 with respect to automatic couplers applies only to track haulage cars which are regularly coupled and uncoupled.

30 CFR §75.1429

WIRE ROPES

Source: Sections 75.1429 through 75.1438 appear at 48 FR 53239, Nov. 25, 1983, unless otherwise noted.

Guide ropes.

If guide ropes are used in shafts for personnel hoisting applications other than shaft development, the nominal strength (manufacturer's published catalog strength) of the guide rope at installation shall meet the minimum value calculated as follows: Minimum value = Static Load x 5.0.

30 CFR §75.1430

Wire ropes; scope.

(a) Sections 75.1430 through 75.1438 apply to wire ropes in service used to hoist--

(1) Persons in shafts or slopes underground; or

(2) Loads in shaft or slope development when persons work below the suspended loads.

(b) These standards do not apply to wire ropes used for elevators.

30 CFR §75.1431

Minimum rope strength.

At installation, the nominal strength (manufacturer's published catalog strength) of wire ropes used for hoisting shall meet the minimum rope strength values obtained by the following formulas in which "L" equals the maximum suspended rope length in feet:

(a) *Winding drum ropes* (all constructions, including rotation resistant).

For rope lengths less than 3,000 feet:

Minimum Value = Static Load x (7.0--0.001L) For

rope lengths 3,000 feet or greater:

Minimum Value = Static Load x 4.0

(b) *Friction drum ropes.*

For rope lengths less than 4,000 feet:
Minimum Value = Static Load x (7.0--0.0005L) For

rope lengths 4,000 feet or greater:

Minimum Value = Static Load x 5.0

(c) *Tail ropes* (balance ropes).

Minimum Value = Weight of Rope x 7.0

[48 FR 53239, Nov. 25, 1983; 48 FR 54975, Dec. 8, 1983]

30 CFR §75.1432

Initial measurement.

After initial rope stretch but before visible wear occurs, the rope diameter of newly installed wire ropes shall be measured at least once in every third interval of active length and the measurements averaged to establish a baseline for subsequent measurements. A record of the measurements and the date shall be made by the person taking the measurements. This record shall be retained until the rope is retired from service.

[60 FR 33719, June 29, 1995]

30 CFR §75.1433

Examinations.

(a) At least once every fourteen calendar days, each wire rope in service shall be visually examined along its entire active length for visible structural damage, corrosion, and improper lubrication or dressing. In addition, visual examination for wear and broken wires shall be made at stress points, including the area near attachments, where the rope rests on sheaves, where the rope leaves the drum, at drum crossovers, and at change-of-layer regions. When any visible condition that results in a reduction of rope strength is present, the affected portion of the rope shall be examined on a daily basis.

(b) Before any person is hoisted with a newly installed wire rope or any wire rope that has not been examined in the previous fourteen calendar days, the wire rope shall be

examined in accordance with paragraph (a) of this section.

(c) At least once every six months, nondestructive tests shall be conducted of the active length of the rope, or rope diameter measurements shall be made—

(1) Wherever wear is evident;

(2) Where the hoist rope rests on sheaves at regular stopping points;

(3) Where the hoist rope leaves the drum at regular stopping points; and

(4) At drum crossover and change-of-layer regions.

(d) At the completion of each examination required by paragraph (a) of this section, the person making the examination shall certify, by signature and date, that the examination has been made. If any condition listed in paragraph (a) of this standard is present, the person conducting the examination shall make a record of the condition and the date. Certifications and records of examinations shall be retained for one year.

(e) The person making the measurements or nondestructive tests as required by paragraph

(f) of this section shall record the measurements or test results and the date. This record shall be retained until the rope is retired from service.

[60 FR 33719, June 29, 1995]

30 CFR §75.1434

Retirement criteria.

Unless damage or deterioration is removed by cutoff, wire ropes shall be removed from service when any of the following conditions occurs:

(a) The number of broken wires within a rope lay length, excluding filler wires, exceeds either--

(1) Five percent of the total number of wires; or

(2) Fifteen percent of the total number of wires within any strand;

(b) On a regular lay rope, more than one broken wire in the valley between strands in one rope lay length;

(c) A loss of more than one-third of the original diameter of the outer wires;

(d) Rope deterioration from corrosion;

(e) Distortion of the rope structure;

(f) Heat damage from any source;

(g) Diameter reduction due to wear that exceeds six percent of the baseline diameter measurement; or

(h) Loss of more than ten percent of rope strength as determined by nondestructive testing.

30 CFR §75.1435

Load end attachments.

(a) Wire rope shall be attached to the load by a method that develops at least 80 percent of the nominal strength of the rope.

(b) Except for terminations where use of other materials is a design feature, zinc (spelter) shall be used for socketing wire ropes. Design feature means either the manufacturer's original design or a design approved by a registered professional engineer.

(c) Load end attachment methods using splices are prohibited.

30 CFR §75.1436

Drum end attachment.

(a) For drum end attachment, wire rope shall be attached--

(1) Securely by clips after making one full turn around the drum spoke;

(2) Securely by clips after making one full turn around the shaft, if the drum is fixed to the shaft; or

(3) By properly assembled anchor bolts, clamps, or wedges, provided that the attachment is a design feature of the hoist drum. Design feature means either the manufacturer's original design or a design approved by a registered professional engineer.

(b) A minimum of three full turns of wire rope shall be on the drum when the rope is extended to its maximum working length

30 CFR §75.1437

End attachment retermination.

Damaged or deteriorated wire rope shall be removed by cutoff and the rope reterminated where there is --

(a) More than one broken wire at an attachment;

(b) Improper installation of an attachment;

(c) Slippage at an attachment; or

(d) Evidence of deterioration from corrosion at an attachment.

30 CFR §75.1438

End attachment replacement.

Wire rope attachments shall be replaced when cracked, deformed, or excessively worn.

Subpart P—Mine Emergencies

30 CFR §75.1501

Emergency evacuations.

(a) For each shift that miners work underground, there shall be in attendance a responsible person designated by the mine operator to take charge during mine emergencies involving a fire, explosion, or gas or water inundation.

(1) The responsible person shall have current knowledge of the assigned location and expected movements of miners underground, the operation of the mine ventilation system, the locations of the mine escapeways and refuge alternatives, the mine communications system, any mine monitoring system if used, locations of firefighting equipment, the mine's Emergency Response Plan, the Mine Rescue Notification Plan, and the Mine Emergency Evacuation and Firefighting Program of Instruction.

(2) The responsible person shall be trained annually in a course of instruction in mine emergency response, as prescribed by MSHA's Office of Educational Policy and Development. The course will include topics such as the following:

(i) Organizing a command center;

(ii) Coordinating firefighting personnel;

(iii) Deploying firefighting equipment;

(iv) Coordinating mine rescue personnel;

(v) Establishing fresh air base;

(vi) Deploying mine rescue teams;

(vii) Providing for mine gas sampling and analysis;

(viii) Establishing security;

(ix) Initiating an emergency mine evacuation;

(x) Contacting emergency personnel; and

(xi) Communicating appropriate information related to the emergency.

(3) The operator shall certify by signature and date after each responsible person has completed the training and keep the certification at the mine for 1 year.

(b) The responsible person shall initiate and conduct an immediate mine evacuation when there is a mine emergency which presents an imminent danger to miners due to fire or explosion or gas or water inundation. Only properly trained and equipped persons essential to respond to the mine emergency may remain underground.

(c) The mine operator shall instruct all miners of the identity of the responsible person designated by the operator for their workshift. The mine operator shall instruct miners of any change in the identity of the responsible person before the start of their workshift.

(d) Nothing in this section shall be construed to restrict the ability of other persons in the mine to warn of an imminent danger which warrants evacuation.

[68 FR 53049, Sept. 9, 2003, as amended at 73 FR 7655, Feb. 8, 2008; 73 FR 80697, Dec. 31, 2008]

30 CFR §75.1502

Mine emergency evacuation and firefighting program of instruction.

Each operator of an underground coal mine shall adopt and follow a mine emergency evacuation and firefighting program that instructs all miners in the proper procedures they must follow if a mine emergency occurs.

(a) *Program approval.* The operator shall submit this program of instruction, and any revisions, for approval to the District Manager of the Coal Mine Safety and Health district in which the mine is located. Within 30 days of approval, the operator shall conduct training in accordance with the revised program.

(b) *New or revised provisions.* Before implementing any new or revised approved provision in the program of instruction, the operator shall instruct miners in the change.

(c) *Instruction plan.* The approved program shall include a specific plan designed to instruct miners on all shifts on the following:

(1) Procedures for—

(i) Evacuating the mine for mine emergencies that present an imminent danger to miners due to fire, explosion, or gas or water inundation;

(ii) Evacuating all miners not required for a mine emergency response; and

(iii) The rapid assembly and transportation of necessary miners, fire suppression equipment, and rescue apparatus to the scene of the mine emergency.

(2) The use, care, and maintenance of self-rescue devices, including hands-on training in the complete donning and transferring of all types of self-rescue devices used at the mine.

(3) The deployment, use, and maintenance of refuge alternatives.

(4) Scenarios requiring a discussion of options and a decision as to the best option for evacuation under each of the various mine emergencies (fires, explosions, or gas or water inundations). These options shall include:

(i) Encountering conditions in the mine or circumstances that require immediate donning of self-rescue devices.

(ii) Using continuous directional lifelines or equivalent devices, tethers, and doors;

(iii) Traversing undercasts or overcasts;

(iv) Switching escapeways, as applicable;

(v) Negotiating any other unique escapeway conditions; and

(vi) Using refuge alternatives.

(5) Location and use of the fire suppression and firefighting equipment and materials available in the mine.

(6) Location of the escapeways, exits, routes of travel to the surface, including the location of continuous directional lifelines or equivalent devices.

(7) Location, quantity, types, and use of stored SCSRs, as applicable.

(8) A review of the mine map; the escapeway system; the escape, firefighting, and emergency evacuation plan in effect at the mine; and the locations of refuge alternatives and abandoned areas.

(9) A description of how miners will receive annual expectations training that includes practical experience in donning and transferring SCSRs in smoke, simulated smoke, or an equivalent environment and breathing through a realistic SCSR training unit or device that provides the sensation of SCSR airflow resistance and heat.

(10) A summary of the procedures related to deploying refuge alternatives.

(11) A summary of the construction methods for 15 psi stoppings constructed prior to an event.

(12) A summary of the procedures related to refuge alternative use.

(d) *Instructors.*

(1) The mine operator shall designate a person who has the ability, training, knowledge, or experience to conduct the mine emergency evacuation instruction and drills in his or her area of expertise.

(2) Persons conducting SCSR donning and transferring training shall be able to effectively train and evaluate whether miners can successfully don the SCSR and transfer to additional SCSR devices.

[71 FR 71452, Dec. 8, 2006, as amended at 73 FR 80697, Dec. 31, 2008]

30 CFR §75.1502

Use of fire suppression equipment.

In addition to the approved program of instruction required by 30 CFR 75.1502, each operator of an underground coal mine shall ensure the following.

(a) Working section. At least two miners in each working section on each production shift shall be proficient in the use of all fire suppression equipment available on such working section, and know the location of such fire suppression equipment.

(b) Attended equipment. Each operator of attended equipment specified in 30 CFR §75.1107-1(c)(1), and each miner assigned to perform job duties at the job site in the direct line of sight of attended equipment as described in 30 CFR §75.1107-1(c)(2), shall be proficient in the use of fire suppression devices installed on such attended equipment.

(c) Maintenance shift. The shift foreman and at least one miner for every five miners working underground on a maintenance shift shall be proficient in the use of fire suppression equipment available in the mine, and know the location of such fire suppression equipment.

[71 FR 71452, Dec. 8, 2006]

30 CFR §75.1504

Mine emergency evacuation training and drills.

Each operator of an underground coal mine shall conduct mine emergency evacuation training and drills and require all miners to participate.

(a) Schedule of training and drills. Each miner shall participate in a mine emergency evacuation training and drill once each quarter. Quarters shall be based on a calendar year (Jan-Mar, Apr-Jun, Jul-Sep, Oct-Dec). In addition—

(1) A newly hired miner, who has not participated in a mine emergency evacuation training and drill at the mine within the previous 3 months, shall participate in the next applicable mine emergency evacuation training and drill.

(2) Prior to assuming duties on a section or outby work location, a foreman shall travel both escapeways in their entirety.

(b) Content of quarterly training and drill. Each quarterly evacuation training and drill shall include the following:

(1) Hands-on training on all types of self-rescue devices used at the mine, which includes—

(i) Instruction and demonstration in the use, care, and maintenance of self-rescue devices;

(ii) The complete donning of the SCSR by assuming a donning position, opening the device, activating the device, inserting the mouthpiece, and putting on the nose clip; and

(iii) Transferring between all applicable self-rescue devices.

(2) Training that emphasizes the importance of—

(i) Recognizing when the SCSR is not functioning properly and demonstrating how to initiate and reinitiate the starting sequence;

(ii) Not removing the mouthpiece, even to communicate, until the miner reaches fresh air; and

(iii) Proper use of the SCSR by controlling breathing and physical exertion.

(3) A realistic escapeway drill that is initiated and conducted with a different approved scenario each quarter and during which each miner—

(i) Travels the primary or alternate escapeway in its entirety, alternating escapeways each quarter;

(ii) Physically locates and practices using the continuous directional lifelines or equivalent devices and tethers, and physically locates the stored SCSRs and refuge alternatives;

(iii) Traverses undercasts or overcasts and doors;

(iv) Switches escapeways, as applicable; and

(v) Negotiates any other unique escapeway conditions.

(4) A review of the mine and escapeway maps, the firefighting plan, and the mine emergency evacuation plan in effect at the mine, which shall include:

(i) Informing miners of the locations of fire doors, check curtains, changes in the routes of travel, and plans for diverting smoke from escapeways.

(ii) Locating escapeways, exits, routes of travel to the surface, abandoned areas, and refuge alternatives.

(5) Operation of the fire suppression equipment available in the mine and the location and use of firefighting equipment and materials.

(6) Reviewing the procedures for deploying refuge alternatives and components.

(7) For miners who will be constructing the 15 psi stoppings prior to an event, reviewing the procedures for constructing them.

(8) Reviewing the procedures for use of the refuge alternatives and components.

(9) Task training in proper transportation of the refuge alternatives and components.

(c) Annual expectations training. Over the course of each year, each miner shall participate in expectations training that includes the following:

(1) Donning and transferring SCSRs in smoke, simulated smoke, or an equivalent environment.

(2) Breathing through a realistic SCSR training unit that provides the sensation of SCSR airflow resistance and heat.

(3) Deployment and use of refuge alternatives similar to those in use at the mine, including—

(i) Deployment and operation of component systems; and

(ii) Instruction on when to use refuge alternatives during a mine emergency, emphasizing that it is the last resort when escape is impossible.

(4) A miner shall participate in expectations training within one quarter of being employed at the mine.

(d) Certification of training and drills. At the completion of each training or drill required in this section, the operator shall certify by signature and date that the training or drill was held in accordance with the requirements of this section.

(1) This certification shall include the names of the miners participating in the training or drill. For each miner, this certification shall list the content of the training or drill component completed, including the escapeway traveled and scenario used, as required in paragraphs (b) and (c) of this section.

(2) Certifications shall be kept at the mine for one year.

(3) Upon request, the certifications shall be made available to an authorized representative of the Secretary and the representative of the miners.

(4) Upon request, a copy of the certification that shows his or her own training shall be provided to the participating miner.

[71 FR 71452, Dec. 8, 2006, as amended at 73 FR 80698, Dec. 31, 2008]

30 CFR §75.1505

Escapeway maps.

(a) Content and accessibility. An escapeway map shall show the designated escapeways from the working sections or the miners' work stations to the surface or the exits at the bottom of the shaft or slope, refuge alternatives, and SCSR storage locations. The escapeway map shall be posted or readily accessible for all miners—

(1) In each working section;

(2) In each area where mechanized mining equipment is being installed or removed;

(3) At the refuge alternative; and

(4) At a surface location of the mine where miners congregate, such as at the mine bulletin board, bathhouse, or waiting room.

(b) Keeping maps current. All maps shall be kept up-to-date and any change in route of travel, location of doors, location of refuge alternatives, or direction of airflow shall be shown on the maps by the end of the shift on which the change is made.

(c) Informing affected miners. Miners underground on a shift when any such change is

made shall be notified immediately of the change and other affected miners shall be informed of the change before entering the underground areas of the mine.

[71 FR 71452, Dec. 8, 2006, as amended at 73 FR 80698, Dec. 31, 2008]

30 CFR §75.1506

Refuge alternatives.

(a) Each operator shall provide refuge alternatives and components as follows:

(1) Prefabricated self-contained units, including the structural, breathable air, air monitoring, and harmful gas removal components of the unit, shall be approved under 30 CFR part 7; and

(2) The structural components of units consisting of 15 psi stoppings constructed prior to an event shall be approved by the District Manager, and the breathable air, air monitoring, and harmful gas removal components of these units shall be approved under 30 CFR part 7.

(3) Prefabricated refuge alternative structures that states have approved and those that MSHA has accepted in approved Emergency Response Plans (ERPs) that are in service prior to March 2, 2009 are permitted until December 31, 2018, or until replaced, whichever comes first. Breathable air, air-monitoring, and harmful gas removal components of either a prefabricated self-contained unit or a unit consisting of 15 psi stoppings constructed prior to an event in a secure space and an isolated atmosphere that states have approved and those that MSHA has accepted in approved ERPs that are in use prior to March 2, 2009 are permitted until December 31, 2013, or until replaced, whichever comes first. Refuge alternatives consisting of materials pre-positioned for miners to deploy in a secure space with an isolated atmosphere that MSHA has accepted in approved ERPs that are in use prior to March 2, 2009 are permitted until December 31, 2010, or until replaced, whichever comes first.

(b) Except as permitted under paragraph (a)(3) of this section, each operator shall provide refuge alternatives with sufficient capacity to accommodate all persons working underground.

(1) Refuge alternatives shall provide at least 15 square feet of floor space per person and 30 to 60 cubic feet of volume per person according to the following chart. The airlock can be included in the space and volume if waste is disposed outside the refuge alternative.

Mining height (inches)	Unrestricted volume (cubic feet) per person*
36 or less	30
>36-≤42	37.5
>42-≤48	45
>48-≤54	52.5
>54	60

*Includes an adjustment of 12 inches for clearances.

(2) Refuge alternatives for working sections shall accommodate the maximum number of persons that can be expected on or near the section at any time.

(3) Each refuge alternative for outby areas shall accommodate persons reasonably expected to use it.

(c) Refuge alternatives shall be provided at the following locations:

(1) Within 1,000 feet from the nearest working face and from locations where mechanized mining equipment is being installed or removed except that for underground anthracite coal mines that have no electrical face equipment, refuge alternatives shall be provided if the nearest working face is greater than 2,000 feet from the surface.

(2) Spaced within one-hour travel distances in outby areas where persons work such that persons in outby areas are never more than a 30-minute travel distance from a refuge alternative or safe exit. However, the operator may request and the District Manager may approve a different location in the ERP. The operator's request shall be based on an assessment of the risk to persons in outby areas, considering the following factors: proximity to seals; proximity to potential fire or ignition sources; conditions in the outby areas; location of stored SCSRs; and proximity to the most direct, safe, and practical route to an intake escapeway.

(d) Roof and rib support for refuge alternative locations shall be specified in the mine's roof control plan.

(e) The operator shall protect the refuge alternative and contents from damage during transportation, installation, and storage.

(f) A refuge alternative shall be removed from service if examination reveals damage that interferes with the functioning of the refuge alternative or any component.

(1) If a refuge alternative is removed from service, the operator shall withdraw all persons from the area serviced by the refuge alternative, except those persons referred to in §104(c) of the Mine Act.

(2) Refuge alternative components removed from service shall be replaced or be repaired for return to service in accordance with the manufacturer's specifications.

(g) At all times, the site and area around the refuge alternative shall be kept clear of

machinery, materials, and obstructions that could interfere with the deployment or use of the refuge alternative.

(h) Each refuge alternative shall be conspicuously identified with a sign or marker as follows:

(1) A sign or marker made of a reflective material with the word “REFUGE” shall be posted conspicuously at each refuge alternative.

(2) Directional signs made of a reflective material shall be posted leading to each refuge alternative location.

(i) During use of the refuge alternative, the atmosphere within the refuge alternative shall be monitored. Changes or adjustments shall be made to reduce the concentration of methane to less than 1 percent; to reduce the concentration of carbon dioxide to 1 percent or less and excursions not exceeding 2.5 percent; and to reduce the concentration of carbon monoxide to 25 ppm or less. Oxygen shall be maintained at 18.5 to 23 percent.

(j) Refuge alternatives shall contain a fire extinguisher that—

(1) Meets the requirements for portable fire extinguishers used in underground coal mines under this part;

(2) Is appropriate for extinguishing fires involving the chemicals used for harmful gas removal; and

(3) Uses a low-toxicity extinguishing agent that does not produce a hazardous by-product when activated.

[73 FR 80698, Dec. 31, 2008]

30 CFR §75.1507

Emergency Response Plan; refuge alternatives.

(a) The Emergency Response Plan (ERP) shall include the following for each refuge alternative and component:

(1) The types of refuge alternatives used in the mine, i.e., a prefabricated self-contained unit or a unit consisting of 15 psi stoppings constructed prior to an event in a secure space and an isolated atmosphere.

(2) Procedures or methods for maintaining approved refuge alternatives and components.

(3) The rated capacity of each refuge alternative, the number of persons expected to use each refuge alternative, and the duration of breathable air provided per person by the approved breathable air component of each refuge alternative.

(4) The methods for providing breathable air with sufficient detail of the component's capability to provide breathable air over the duration stated in the approval.

(5) The methods for providing ready backup oxygen controls and regulators.

(6) The methods for providing an airlock and for providing breathable air in the airlock, except where adequate positive pressure is maintained.

(7) The methods for providing sanitation facilities.

(8) The methods for harmful gas removal, if necessary.

(9) The methods for monitoring gas concentrations, including charging and calibration of equipment.

(10) The method for providing lighting sufficient for persons to perform tasks.

(11) Suitable locations for the refuge alternatives and an affirmative statement that the locations are—

(i) Not within direct line of sight of the working face; and

(ii) Where feasible, not placed in areas directly across from, nor closer than 500 feet radially from, belt drives, take-ups, transfer points, air compressors, explosive magazines, seals, entrances to abandoned areas, and fuel, oil, or other flammable or combustible material storage. However, the operator may request and the District Manager may approve an alternative location in the ERP if mining involves two-entry systems or yield pillars in a longwall that would prohibit locating the refuge alternative out of direct line of sight of the working face.

(12) The maximum mine air temperature at each of the locations where refuge alternatives are to be placed.

(b) For a refuge alternative consisting of 15 psi stoppings constructed prior to an event in a secure space and an isolated atmosphere, the ERP shall specify that—

(1) The breathable air components shall be approved by MSHA; and

(2) The refuge alternative can withstand exposure to a flash fire of 300 degrees Fahrenheit (°F) for 3 seconds and a pressure wave of 15 pounds per square inch (psi) overpressure for 0.2 seconds.

(c) If the refuge alternative sustains persons for only 48 hours, the ERP shall detail advanced arrangements that have been made to assure that persons who cannot be rescued within 48 hours will receive additional supplies to sustain them until rescue. Advance arrangements shall include the following:

(1) Pre-surveyed areas for refuge alternatives with closure errors of less than 20,000:1.

(2) An analysis to demonstrate that the surface terrain, the strata, the capabilities of the drill rig, and all other factors that could affect drilling are such that a hole sufficient to provide required supplies and materials reliably can be promptly drilled within 48 hours of an accident at a mine.

(3) Permissions to cross properties, build roads, and construct drill sites.

(4) Arrangement with a drilling contractor or other supplier of drilling services to provide a suitable drilling rig, personnel and support so that a hole can be completed to the refuge alternative within 48 hours.

(5) Capability to promptly transport a drill rig to a pre-surveyed location such that a drilled hole would be completed and located near a refuge alternative structure within 48 hours of an accident at a mine.

(6) The specifications of pipes, air lines, and approved fans or approved compressors that will be used.

(7) A method for assuring that within 48 hours, breathable air shall be provided.

(8) A method for assuring the immediate availability of a backup source for supplying breathable air and a backup power source for surface installations.

(d) The ERP shall specify that the refuge alternative is stocked with the following:

(1) A minimum of 2,000 calories of food and 2.25 quarts of potable water per person per day in approved containers sufficient to sustain the maximum number of persons reasonably expected to use the refuge alternative for at least 96 hours, or for 48 hours if advance arrangements are made under paragraph (c) of this section;

(2) A manual that contains sufficient detail for each refuge alternative or component addressing in-mine transportation, operation, and maintenance of the unit;

(3) Sufficient quantities of materials and tools to repair components; and

(4) First aid supplies.

[73 FR 80699, Dec. 31, 2008]

30 CFR §75.1508

Training and records for examination, maintenance and repair of refuge alternatives and components.

(a) Persons examining, maintaining, or repairing refuge alternatives and components shall be instructed in how to perform this work.

(1) The operator shall assure that all persons assigned to examine, maintain, and repair refuge alternatives and components are trained.

(2) The mine operator shall certify, by signature and date, the training of persons who examine, maintain, and repair refuge alternatives and components.

(b) At the completion of each repair, the person conducting the maintenance or repair shall make a record of all corrective action taken.

(c) Training certifications and repair records shall be kept at the mine for one year.

[73 FR 80699, Dec. 31, 2008]

Subpart Q - Communications

30 CFR §75.1600

Communications.

Telephone service or equivalent two-way communication facilities, approved by the Secretary or his authorized representative, shall be provided between the surface and each landing of main shafts and slopes and between the surface and each working section of any coal mine that is more than 100 feet from a portal.

30 CFR §75.1600-1

Communication facilities; main portals; installation requirements.

A telephone or equivalent two-way communication facility shall be located on the surface within 500 feet of all main portals, and shall be installed either in a building or in a box-like structure designed to protect the facilities from damage by inclement weather. At least one of these communication facilities shall be at a location where a responsible person who is always on duty when men are underground can hear the facility and respond immediately in the event of an emergency.

[38 FR 29999, Oct. 31, 1973]

30 CFR §75.1600-2

Communication facilities; working sections; installation and maintenance requirements; audible or visual alarms.

(a) Telephones or equivalent two-way communication facilities provided at each working section shall be located not more than 500 feet outby the last open crosscut and not more than 800 feet from the farthest point of penetration of the working places on such section.

(b) The incoming communication signal shall activate an audible alarm, distinguishable from the surrounding noise level, or a visual alarm that can be seen by a miner regularly employed on the working section.

(c) If a communication system other than telephones is used and its operation depends entirely upon power from the mine electric system, means shall be provided to permit continued communication in the event the mine electric power fails or is cut off; provided, however, that where trolley phones and telephones are both used, an alternate source of power for the trolley phone system is not required.

(d) Trolley phones connected to the trolley wire shall be grounded in accordance with Subpart H of this part.

(e) Telephones or equivalent two-way communication facilities shall be maintained in good operating condition at all times. In the event of any failure in the system that results in loss of communication, repairs shall be started immediately, and the system restored to operating condition as soon as possible.

[38 FR 29999, Oct. 31, 1973]

30 CFR §75.1600-3

Communications facilities; refuge alternatives.

(a) Refuge alternatives shall be provided with a communications system that consists of—

(1) A two-way communication facility that is a part of the mine communication system, which can be used from inside the refuge alternative; and

(2) An additional communication system and other requirements as defined in the communications portion of the operator's approved Emergency Response Plan.

[73 FR 80700, Dec. 31, 2008]

Subpart R--Miscellaneous

30 CFR §75.1700

Oil and gas wells.

Each operator of a coal mine shall take reasonable measures to locate oil and gas wells penetrating coalbeds or any underground area of a coal mine. When located, such operator shall establish and maintain barriers around such oil and gas wells in accordance with State laws and regulations, except that such barriers shall not be less than 300 feet in diameter, unless the Secretary or his authorized representative permits a lesser barrier consistent with the applicable State laws and regulations where such lesser barrier will be adequate to protect against hazards from such wells to the miners in such mine, or unless the Secretary or his authorized representative requires a greater barrier where the depth of the mine, other geologic conditions, or other factors warrant such a greater barrier.

30 CFR §75.1702

Smoking; prohibition.

No person shall smoke, carry smoking materials, matches, or lighters underground, or smoke in or around oil houses, explosives magazines, or other surface areas where such practice may cause a fire or explosion. The operator shall institute a program, approved by the Secretary, to insure that any person entering the underground area of the mine does not carry smoking materials, matches, or lighters.

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14696, Apr. 6, 1982; 60 FR 33719, June 29, 1995]

30 CFR §75.1702

Smoking; prohibition.

No person shall smoke, carry smoking materials, matches, or lighters underground, or smoke in or around oil houses, explosives magazines, or other surface areas where such practice may cause a fire or explosion. The operator shall institute a program, approved by the Secretary, to insure that any person entering the underground area of the mine does not carry smoking materials, matches, or lighters.

[35 FR 17890, Nov. 20, 1970, as amended at 60 FR 33723, June 29, 1995]

30 CFR §75.1702-1

Smoking programs.
Programs required under §75.1702 shall be submitted to the Coal Mine Safety District Manager for approval on or before May 30, 1970.

30 CFR §75.1703

Portable electric lamps.

Persons underground shall use only permissible electric lamps approved by the Secretary for portable illumination. No open flame shall be permitted in the underground area of any coal mine, except as permitted under §75.1106.

30 CFR §75.1703-1

Permissible lamps.

Lamps approved by the Bureau of Mines or the Mine Safety and Health Administration under Part 19 or Part 20 of this chapter (Bureau of Mines Schedule 6D and Schedule 10C) are approved lamps for the purposes of §75.1703.

30 CFR §75.1707-1

New working section.

The term "new working section" as used in §75.1707 means any extension of the belt or trolley haulage system in main, cross, and room entries necessary for the development of the mine on and after March 30, 1970. Room entries being developed as of March 30, 1970, with certified stop line limitations as shown on the mine map and retreating panels shall not be considered as new working sections.

30 CFR §75.1708

Surface structures, fireproofing.

After March 30, 1970, all structures erected on the surface within 100 feet of any mine opening shall be of fireproof construction. Unless structures existing on or prior to such date which are located within 100 feet of any mine opening are of such construction, fire doors shall be erected at effective points in mine openings to prevent smoke or fire from outside sources endangering miners underground. These doors shall be tested at least monthly to insure effective operation. A record of such tests shall be kept in an area on the surface of the mine chosen by the operator to minimize the danger of destruction by fire or other hazard and shall be available for inspection by interested persons.

30 CFR §75.1708-1

Surface structures; fireproof construction.

Structures of fireproof construction is interpreted to mean structures with fireproof exterior surfaces.

30 CFR §75.1709

Accumulations of methane and coal dust on surface coal-handling facilities.

Adequate measures shall be taken to prevent methane and coal dust from accumulating in excessive concentrations in or on surface coal-handling facilities, but in no event shall methane be permitted to accumulate in concentrations in or on surface coal-handling facilities in excess of limits established for methane by the Secretary on and after March 30, 1971. Where coal is dumped at or near air-intake openings, provisions shall be made to avoid dust from entering the mine.

30 CFR §75.1710

Canopies or cabs; diesel-powered and electric face equipment.

In any coal mine where the height of the coalbed permits, an authorized representative of the Secretary may require that diesel- powered and electric face equipment, including

shuttle cars, be provided with substantially constructed canopies or cabs to protect the miners operating such equipment from roof falls and from rib and face rolls.

[61 FR 55527, Oct. 25, 1996]

30 CFR §75.1710-1

Canopies or cabs; self-propelled diesel-powered and electric face equipment; installation requirements.

(a) Except as provided in paragraph (f) of this section, all self-propelled diesel-powered and electric face equipment, including shuttle cars, which is employed in the active workings of each underground coal mine on and after January 1, 1973, shall, in accordance with the schedule of time specified in paragraphs (a)(1), (2), (3), (4), (5), and (6) of this section, be equipped with substantially constructed canopies or cabs, located and installed in such a manner that when the operator is at the operating controls of such equipment he shall be protected from falls of roof, face, or rib, or from rib and face rolls. The requirements of this paragraph (a) shall be met as follows:

(1) On and after January 1, 1974, in coal mines having mining heights of 72 inches or more;

(2) On and after July 1, 1974, in coal mines having mining heights of 60 inches or more, but less than 72 inches;

(3) On and after January 1, 1975, in coal mines having mining heights of 48 inches or more, but less than 60 inches;

(4) On and after July 1, 1975, in coal mines having mining heights of 36 inches or more, but less than 48 inches;

(5)(i) On and after January 1, 1976, in coal mines having mining heights of 30 inches or more, but less than 36 inches,

(ii) On and after July 1, 1977, in coal mines having mining heights of 24 inches or more, but less than 30 inches, and

(6) On and after July 1, 1978, in coal mines having mining heights of less than 24 inches.

(b)(1) For purposes of this section, a canopy means a structure which provides overhead protection against falls of roof.

(2) For purposes of this section, a cab means a structure which provides overhead and lateral protection against falls of roof, rib, and face, or rib and face rolls.

(c) In determining whether to install substantially constructed canopies as opposed to substantially constructed cabs, the operator shall consider and take into account the following factors:

(1) The mining method used;

(2) Physical limitations, including but not limited to the dip of the coalbed, and roof, rib, and face conditions;

(3) Previous accident experience, if any, caused by falls of roof, rib, and face, or rib and face rolls;

(4) Overhead protection, such as that afforded by a substantially constructed canopy, against falls of roof will always be required; and

(5) Lateral protection, such as that afforded by a substantially constructed cab, may also be necessary where the occurrence of falls of rib and face, or rib and face rolls is likely.

(d) For purposes of this section, a canopy or cab will be considered to be substantially constructed if a registered engineer certifies that such canopy or cab has the minimum structural capacity to support elastically: (1) A dead weight load of 18,000 pounds, or (2) 15 p.s.i. distributed uniformly over the plan view area of the structure, whichever is lesser.

(e) Evidence of the certification required by paragraph (d) of this section shall be furnished by attaching a plate, label, or other appropriate marking to the canopy or cab for which certification has been made, stating that such canopy or cab meets the minimum requirements for structural capacity set forth in paragraph (d) of this section. Written evidence of such certification shall also be retained by the operator, and shall be made available to an authorized representative of the Secretary upon request. Written evidence of certification may consist of the report of the registered engineer who certified the canopy or cab, or of information from the manufacturer of the canopy or cab stating that a registered engineer has certified that the canopy or cab meets the minimum requirements for structural capacity set forth in paragraph (d) of this section.

(f) An operator may apply to the Director of Technical Support, Mine Safety and Health Administration, Department of Labor, 201 12th Street South, Arlington, VA 22202-5452, for approval of the installation of devices to be used in lieu of substantially constructed canopies or cabs on self-propelled diesel-powered and electric face equipment. The Director of Technical Support may approve such devices if he determines that the use thereof will afford the equipment operator no less than the same measure of protection from falls of roof, face, or rib, or from rib and face rolls as would a substantially constructed canopy or cab meeting the requirements of this section.

[37 FR 20690, Oct. 3, 1972, as amended at 41 FR 23200, June 9, 1976; 43 FR 12320, Mar. 24, 1978; 47 FR 28096, June 29, 1982; 61 FR 55527, Oct. 25, 1996; 67 FR 38386, June 4, 2002; 80 FR 52992, Sept. 2, 2015]

30 CFR §75.1711

Sealing of mines.

On or after March 30, 1970, the opening of any coal mine that is declared inactive by the operator, or is permanently closed, or abandoned for more than 90 days, shall be sealed by the operator in a manner prescribed by the Secretary. Openings of all other mines shall be adequately protected in a manner prescribed by the Secretary to prevent entrance by unauthorized persons.

30 CFR §75.1711-1

Sealing of shaft openings.

Shaft openings required to be sealed under §75.1711 shall be effectively capped or filled. Filling shall be for the entire depth of the shaft and, for the first 50 feet from the bottom of the coalbed, the fill shall consist of incombustible material. Caps consisting of a 6-inch thick concrete cap or other equivalent means may be used for sealing. Caps shall be equipped with a vent pipe at least 2 inches in diameter extending for a distance of at least 15 feet above the surface of the shaft.

30 CFR §75.1711-2

Sealing of slope or drift openings.

Slope or drift openings required to be sealed under §75.1711 shall be sealed with solid, substantial, incombustible material, such as concrete blocks, bricks or tile, or shall be completely filled with incombustible material for a distance of at least 25 feet into such openings.

30 CFR §75.1711-3

Openings of active mines.

The openings of all mines not declared by the operator, to be inactive, permanently closed, or abandoned for less than 90 days shall be adequately fenced or posted with conspicuous signs prohibiting the entrance of unauthorized persons.

30 CFR §75.1712

Bath houses and toilet facilities.

The Secretary may require any operator to provide adequate facilities for the miners to change from the clothes worn underground, to provide for the storing of such clothes from shift to shift, and to provide sanitary and bathing facilities. Sanitary toilet facilities shall be provided in the active workings of the mine when such surface facilities are not readily accessible to the active workings.

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14696, Apr. 6, 1982; 60 FR 33719, June 29, 1995]

30 CFR §75.1712-1

Availability of surface bathing facilities; change rooms; and sanitary facilities.

Except where a waiver has been granted pursuant to the provisions of §75.1712-4, each operator of an underground coal mine shall on and after December 30, 1970, provide bathing facilities, clothing change rooms, and sanitary facilities, as hereinafter prescribed, for the use of the miners at the mine.

30 CFR §75.1712-2

Location of surface facilities.

Bathhouses, change rooms, and sanitary toilet facilities shall be in a location convenient for the use of the miners. Where such facilities are designed to serve more than one mine, they shall be centrally located so as to be as convenient for the use of the miners in all the mines served by such facilities

30 CFR §75.1712-3

Minimum requirements of surface bathing facilities, change rooms, and sanitary toilet facilities.

(a) All bathing facilities, change rooms, and sanitary toilet facilities shall be provided with adequate light, heat, and ventilation so as to maintain a comfortable air temperature and to minimize the accumulation of moisture and odors, and such facilities shall be maintained in a clean and sanitary condition.

(b) Bathing facilities, change rooms, and sanitary toilet facilities shall be constructed and equipped so as to comply with applicable State and local building codes: *Provided, however,* That where no State or local building codes apply to such facilities, or where no State or local building codes exist, such facilities shall be constructed and equipped so as to meet the minimum construction requirements of the National Building Code; and the minimum plumbing requirements of the U.S.A. Standard Plumbing Code, ASA A40.8-1955.

(c) In addition to the minimum requirements specified in paragraphs (a) and (b) of this §75.1712-3, facilities maintained in accordance with §75.1712-1 shall include the following:

(1) *Bathing facilities.* (i) Showers shall be provided with both hot and cold water.

(ii) At least one shower head shall be provided where five or less miners use such showers.

(iii) Where five or more miners use such showers, sufficient showers shall be furnished to provide approximately one shower head for each five miners.

(iv) A suitable cleansing agent shall be provided for use at each shower.

(2) *Sanitary toilet facilities.* (i) At least one sanitary flush toilet shall be provided where 10 or less miners use such facilities.

(ii) Where 10 or more miners use such sanitary toilet facilities, sufficient toilets shall be furnished to provide approximately one sanitary flush toilet for each 10 miners.

(iii) Where 30 or more miners use sanitary toilet facilities, one urinal may be substituted for one sanitary flush toilet, however, where such substitutions are made they shall not reduce the number of toilets below a ratio of two toilets to one urinal.

(iv) An adequate supply of toilet paper shall be provided with each toilet.

(v) Adequate handwashing facilities or hand lavatories shall be provided in or adjacent to each toilet facility.

(3) *Change rooms.* (i) Individual clothes storage containers or lockers shall be provided for storage of miners clothing and other incidental personal belongings during and between shifts.

(ii) Change rooms shall be provided with ample space to permit the use of such facilities by all miners changing clothes prior to and after each shift.

30 CFR §75.1712-4

Waiver of surface facilities requirements.

The Coal Mine Safety District Manager for the district in which the mine is located may, upon written application by the operator, waive any or all of the requirements of §§75.1712-1 through 75.1712-3 if he determines that the operator of the mine cannot or need not meet any part or all of such requirements, and, upon issuance of such waiver, he shall set forth the facilities which will not be required and specific reason or reasons for such waiver.

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14696, Apr.6, 1982; 60 FR 33719, June 29, 1995]

30 CFR §75.1712-5

Application for waiver of surface facilities.

Applications for waivers of the requirements of §§75.1712-1 through 75.1712-3 shall be

filed with the Coal Mine Safety District Manager and shall contain the following information:

(a) The name and address of the mine operator;

(b) The name and location of the mine;

(c) A statement explaining why, in the opinion of the operator, the installation or maintenance of the facilities is impractical or unnecessary.

30 CFR §75.1712-6

Underground sanitary facilities; approved sanitary toilets; installation and maintenance.

(a) Except as provided in §75.1712-7, each operator of an underground coal mine shall, on and after December 30, 1970, provide and maintain one approved sanitary toilet, together with an adequate supply of toilet tissue, in a dry location under protected roof, within 500 feet of each working place in the mine where miners are regularly employed during the mining cycle. A single approved sanitary toilet may serve two or more working places in the same mine, if it is located within 500 feet of each such working place.

(b) Only sanitary toilets approved by the Health Division, Coal Mine Safety, Mine Safety and Health Administration shall meet the requirements of this section.

[68 FR 37087, June 23, 2003]

30 CFR §75.1712-7
Underground sanitary facilities; waiver of requirements.

If it has been determined by the Coal Mine Safety District Manager for the district in which the mine is located that sanitary toilets cannot be provided and maintained within 500 feet of a working place because of the thickness of the coal seam or because of any other physical restriction in the underground workings, he may, upon written application by the operator, waive the location requirements for underground sanitary facilities with respect to such working place.

30 CFR §75.1712-8

Application for waiver of location requirements for underground sanitary facilities.

Applications for waivers of the location requirements of §75.1712-6 shall be filed with the Coal Mine Safety District Manager and shall contain the following information:

(a) The name and address of the mine operator;

(b) The name and location of the mine;

(c) The thickness of the coal seam in each working place in the mine for which a waiver is requested; and

(d) Other physical restrictions in the mine (for example, poor roof conditions, excessive water, timbering, etc.).

If a sanitary toilet cannot be installed within 500 feet of a working place because of physical conditions other than the thickness of the coal seam, the operator shall also include a short statement specifying areas in the mine which could be considered possible alternative sites for installation of such facilities.

30 CFR §75.1712-9

Issuance of waivers.

Following the receipt of an application submitted in accordance with the provisions of §75.1712-8, the Coal Mine Safety District Manager shall, if he determines that the operator cannot meet the location requirements of §75.1712-6 with respect to any or all of the working places in the mine because of the coal seam thickness or because of other physical restriction, issue a waiver of the requirements of this section and designate an alternative site for installation of such facilities. The waiver issued shall specify each working place to which it shall apply, set forth the reasons for such waiver, and the reasons for designation of the alternative site.

30 CFR §75.1712-10

Underground sanitary facilities; maintenance.

Sanitary toilets shall be regularly maintained in a clean and sanitary condition. Holding tanks shall be serviced and cleaned when full and in no case less than once each week by draining or pumping or by removing them to the surface for cleaning or recharging. Transfer tanks and transfer equipment used underground shall be equipped with suitable fittings to permit complete drainage of holding tanks without spillage and allow for the sanitary transportation of wastes to the surface. Waste shall be disposed of on the surface in accordance with State and local laws and regulations.

30 CFR §75.1713

Emergency medical assistance; first-aid.

Each operator shall make arrangements in advance for obtaining emergency medical assistance and transportation for injured persons. Emergency communications shall be provided to the nearest point of assistance. Selected agents of the operator shall be trained in first-aid and first-aid training shall be made available to all miners. Each coal mine shall have an adequate supply of first-aid equipment located on the surface, at the bottom of shafts and slopes, and at other strategic locations near the working faces. In fulfilling each of the requirements of this section, the operator shall meet at least minimum

requirements prescribed by the Secretary of Health and Human Services.

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14696, Apr. 6, 1982; 47 FR 28096, June 29, 1982; 60 FR 33719, June 29, 1995]

30 CFR §75.1713-1

Arrangements for emergency medical assistance and transportation for injured persons; agreements; reporting requirements; posting requirements.

(a) Each operator of an underground coal mine shall make arrangements with a licensed physician, medical service, medical clinic, or hospital to provide 24-hour emergency medical assistance for any person injured at the mine.

(b) Each operator of an underground coal mine shall make arrangements with an ambulance service, or otherwise provide, for 24-hour emergency transportation for any person injured at the mine.

(c) Each operator shall, on or before December 30, 1970, report to the District Manager for the district in which the mine is located the name, title and address of the physician, medical service, medical clinic, hospital or ambulance service with whom arrangements have been made, or otherwise provided, in accordance with the provisions of paragraphs (a) and (b) of this §75.1713-1.

(d) Each operator shall, within 10 days after any change of the arrangements required to be reported under the provisions of this §75.1713-1, report such changes to the District Manager. If such changes involve a substitution of persons, the operator shall provide the name, title, and address of the person substituted together with the name and address of the medical service, medical clinic, hospital, or ambulance service with which such person or persons are associated.

(e) Each operator shall, immediately after making an arrangement required under the provisions of paragraphs (a) and (b) of this §75.1713-1, or immediately after any change of such arrangement, post at appropriate places at the mine the names, titles, addresses, and telephone numbers of all persons or services currently available under such arrangements to provide medical assistance and transportation at the mine.

30 CFR §75.1713-2

Emergency communications; requirements.

(a) Each operator of an underground coal mine shall establish and maintain a communication system from the mine to the nearest point of medical assistance for use in an emergency.

(b) The emergency communication system required to be maintained under paragraph (a) of this §75.1713-2 may be established by telephone or radio transmission or by any other means of prompt communication to any facility (for example, the local sheriff, the State

highway patrol, or local hospital) which has available the means of communication with the person or persons providing emergency medical assistance or transportation in accordance with the provisions of §75.1713-1.

30 CFR §75.1713-3

First-Aid training; supervisory employees.

The mine operator shall conduct first-aid training courses for selected supervisory employees at the mine. Within 60 days after the selection of a new supervisory employee to be so trained, the mine operator shall certify by signature and date the name of the employee and date on which the employee satisfactorily completed the first-aid training course. The certification shall be kept at the mine and made available on request to an authorized representative of the Secretary.

30 CFR §75.1713-4

First-aid training program; availability of instruction to all miners.

On or before June 30, 1971, each operator of an underground coal mine shall make available to all miners employed in the mine a course of instruction in first-aid conducted by the operator or under the auspices of the operator, and such a course of instruction shall be made available to newly employed miners within 6 months after the date of employment.

30 CFR §75.1713-5

First-aid training program; retraining of supervisory employees; availability to all miners.

Beginning January 1, 1971, each operator of an underground coal mine shall conduct refresher first-aid training courses each calendar year for all selected supervisory employees, and make available refresher first-aid training courses to all miners employed in the mine.

30 CFR §75.1713-6

First-aid training program; minimum requirements.

(a) All first-aid training programs required under the provisions of §§75.1713-3 and 75.1713-4 shall include 10 class hours of training in a course of instruction similar to that outlined in "First Aid, A Bureau of Mines Instruction Manual."

(b) Refresher first-aid training programs required under the provisions of §75.1713-5 shall include five class hours of refresher training in a course of instruction similar to that outlined in "First Aid, A Bureau of Mines Instruction Manual."

30 CFR §75.1713-7

First-aid equipment; location; minimum requirements.

(a) Each operator of an underground coal mine shall maintain a supply of the first-aid equipment set forth in paragraph (b) of this §75.1713-7 at each of the following locations:

(1) At the mine dispatcher's office or other appropriate work area on the surface in close proximity to the mine entry;

(2) At the bottom of each regularly traveled slope or shaft; however, where the bottom of such slope or shaft is not more than 1,000 feet from the surface, such first-aid supplies may be maintained on the surface at the entrance to the mine; and

(3) At a point in each working section not more than 500 feet outby the active working face or faces.

(b) The first-aid equipment required to be maintained under the provisions of paragraph (a) of this §75.1713-7 shall include at least the following:

(1) One stretcher;

(2) One broken-back board. (If a splint stretcher combination is used it will satisfy the requirements of both (1) and (2)).

(3) 24 triangular bandages (15 if a splint-stretcher combination is used).

(4) Eight 4-inch bandage compresses;

(5) Eight 2-inch bandage compresses.

(6) Twelve 1-inch adhesive compresses;

(7) One foille;

(8) Two cloth blankets:

(9) One rubber blanket or equivalent substitute.

(10) Two tourniquets;

(11) One 1-ounce bottle of aromatic spirits of ammonia or 1 dozen ammonia ampules.

(12) The necessary complements of arm and leg splints or two each inflatable plastic arm and leg splints.

(c) All first-aid supplies required to be maintained under the provisions of paragraphs (a) and (b) of this §75.1713-7 shall be stored in suitable, sanitary, dust tight, moisture proof containers and such supplies shall be accessible to the miners.

30 CFR §75.1714

Availability of approved self-rescue devices; instruction in use and location.

(a) Each operator shall make available to each miner who goes underground, and to visitors authorized to enter the mine by the operator, an approved self-rescue device or devices which is adequate to protect such person for 1 hour or longer.

(b) Before any person authorized by the operator goes underground, the operator shall instruct and train such person in accordance with provisions set forth in 30 CFR part 48.

[43 FR 54246, Nov. 21, 1978, as amended at 53 FR 10336, Mar. 30, 1988; 60 FR 30401, June 8, 1995; 71 FR 71454, Dec. 8, 2006]

30 CFR §75.1714-1

Approved self-rescue devices.

The requirements of §75.1714 shall be met by making available to each person referred to in that section a self-rescue device or devices, which have been approved by MSHA and NIOSH under 42 CFR part 84, as follows:

(a) A 1-hour SCSR;

(b) A SCSR of not less than 10 minutes and a 1-hour canister; or

(c) Any other self-contained breathing apparatus which provides protection for a period of 1 hour or longer and which is approved for use by MSHA as a self-rescue device when used and maintained as prescribed by MSHA.

[43 FR 54246, Nov. 21, 1978, as amended at 45 FR 80502, Dec. 5, 1980; 60 FR 30398, June 8, 1995]

30 CFR §75.1714-2

Self-rescue devices; use and location requirements.

(a) Self-rescue devices shall be used and located as prescribed in paragraphs (b) through (f) of this section.

(b) Except as provided in paragraph (c), (d), (e), or (f) of this section, self-rescue devices shall be worn or carried at all times by each person when underground.

(c) Where the wearing or carrying of the self-rescue device is hazardous to the person, it shall be placed in a readily accessible location no greater than 25 feet from such person.

(d) Where a person works on or around equipment, the self-rescue device may be placed in a readily accessible location on such equipment.

(e) A mine operator may apply to the District Manager under §75.1502 for permission to place the SCSR more than 25 feet away.

(1) The District Manager shall consider the following factors in deciding whether to permit an operator to place a SCSR more than 25 feet from a miner:

(i) Distance from affected sections to surface,

(ii) Pitch of seam in affected sections,

(iii) Height of coal seam in affected sections,

(iv) Location of escapeways,

(v) Proposed location of SCSRs,

(vi) Type of work performed by affected miners,

(vii) Degree of risk to which affected miners are exposed,

(viii) Potential for breaking into oxygen deficient atmospheres,

(ix) Type of risk to which affected miners are exposed,

(x) Accident history of mine, and

(xi) Other matters bearing upon the safety of miners.

(2) Such application shall not be approved by the District Manager unless it provides that, while underground, all miners whose SCSR is more than 25 feet away shall have a FSR approved by MSHA and NIOSH under 42 CFR part 84 sufficient to enable each miner to get to a SCSR.

(3) An operator may not obtain permission under paragraph (e) of this section to place SCSRs more than 25 feet away from miners on trips into and out of the mine.

(f) If an SCSR is not carried out of the mine at the end of a miner's shift, the place of storage shall be approved by the District Manager. A sign made of reflective material with the word “SCSRs” or “SELF-RESCUERS” shall be conspicuously posted at each SCSR storage location. Direction signs made of a reflective material shall be posted leading to each storage

location.

(g) Where devices of not less than 10 minutes and 1 hour are made available in accordance with §75.1714-1(b), such devices shall be used and located as follows:

(1) Except as provided in paragraphs (c) and (d) of this section, the device of not less than 10 minutes shall be worn or carried at all times by each person when underground, and

(2) The one-hour canister shall be available at all times to all persons when underground in accordance with a plan submitted by the mine operator and approved by the District Manager. When the one-hour canister is placed in a storage location, a sign made of a reflective material with the word "SCSRs" or "SELF-RESCUERS" shall be conspicuously posted at each storage location. Direction signs made of a reflective material shall be posted leading to each storage location.

[43 FR 54246, Nov. 21, 1978, as amended at 60 FR 30401, June 8, 1995; 69 FR 8108, Feb. 23, 2004; 71 FR 12270, Mar. 9, 2006; 71 FR 71454, Dec. 8, 2006]

30 CFR §75.1714-3

Self-rescue devices; inspection, testing, maintenance, repair, and recordkeeping.

(a) Each operator shall provide for proper inspection, testing, maintenance, and repair of self-rescue devices by a person trained to perform such functions.

(b) After each time a self-rescue device is worn or carried by a person, the device shall be inspected for damage and for the integrity of its seal by a person trained to perform this function. Self-rescue devices with broken seals or which are damaged so that the device will not function properly shall be removed from service.

(c) All FSRs approved by MSHA and NIOSH under 42 CFR part 84, except devices using vacuum containers as the only method of sealing, shall be tested at intervals not exceeding 90 days by weighing each device on a scale or balance accurate to within +1 gram. A device that weighs more than 10 grams over its original weight shall be removed from service.

(d) All SCSRs approved by MSHA and NIOSH under 42 CFR part 84 shall be tested in accordance with instructions approved by MSHA and NIOSH. Any device which does not meet the specified test requirements shall be removed from service.

(e) At the completion of each test required by paragraphs (c) and (d) of this section the person making the tests shall certify by signature and date that the tests were done. This person shall make a record of all corrective action taken. Certifications and records shall be kept at the mine and made available on request to an authorized representative of the Secretary.

(f) Self-rescue devices removed from service shall be repaired for return to service only by a person trained to perform such work and only in accordance with the manufacturer's

instructions.

[43 FR 54246, Nov. 21, 1978, as amended at 47 FR 14706, Apr. 6, 1982; 56 FR 1478, Jan. 14, 1991; 60 FR 30398, June 8, 1995; 60 FR 33719, June 29, 1995]

30 CFR §75.1714-4

Additional self-contained self-rescuers (SCSRs).

(a) *Additional SCSRs in work places.* In addition to the requirements in §§75.1714, 75.1714-1, 75.1714-2, and 75.1714-3 of this part, the mine operator shall provide the following:

(1) At least one additional SCSR, which provides protection for a period of one hour or longer, for each person at a fixed underground work location.

(2) Additional SCSRs along the normal travel routes for pumpers, examiners, and other persons who do not have a fixed work location to be stored at a distance an average miner could walk in 30 minutes. The SCSR storage locations shall be determined by using one of the methods found under paragraph (c)(2) of this section.

(b) *Additional SCSRs on mantrips.* If a mantrip or mobile equipment is used to enter or exit the mine, at least one additional SCSR, which provides protection for a period of one hour or longer, shall be available for each person who uses such transportation from portal to portal.

(c) *Additional SCSRs in escapeways.* When each person underground cannot safely evacuate the mine within 30 minutes, the mine operator shall provide additional SCSRs stored in each required escapeway.

(1) Each storage location shall contain at least one SCSR, which provides protection for a period of one hour or longer, for every person who will be inby that location.

(2) Storage locations shall be spaced along each escapeway at 30-minute travel distances no greater than the distances determined by—

(i) Calculating the distance an average miner walks in 30 minutes by using the time necessary for each miner in a sample of typical miners to walk a typical length of each escapeway; or

(ii) Using the SCSR storage location spacing specified in the following table, except for escapeways with grades over 5 percent.

Average entry height	Maximum distance between SCSR storage locations (in ft.)
<40 in. (Crawl)	2,200
>40-<50 in. (Duck Walk)	3,300
>50-<65 in. (Walk Head Bent)	4,400
>65 in. (Walk Erect)	5,700

(d) *Additional SCSRs in hardened rooms.* As an alternative to providing SCSR storage locations in each escapeway, the mine operator may store SCSRs in a hardened room located between adjacent escapeways.

(1) The hardened room shall be designed and constructed to the same explosion force criteria as seals.

(2) The hardened room shall include a means to provide independent, positive pressure ventilation from the surface during an emergency.

(3) The District Manager shall approve the design and construction of hardened rooms in the ventilation plan.

(4) These SCSR storage locations shall be spaced in accordance with paragraph (c) of this section.

(e) *Storage location accessibility.* All SCSRs required under this section shall be stored according to the manufacturers' instructions, in conspicuous locations readily accessible by each person in the mine.

(f) *Storage location signs.* A sign made of reflective material with the words “SCSRs” or “SELF-RESCUERS” shall be conspicuously posted at each storage location. Direction signs made of a reflective material shall be posted leading to each storage location.

[71 FR 71454, Dec. 8, 2006]

30 CFR §75.1714-5

Map locations of self-contained self-rescuers (SCSR).

The mine operator shall indicate the locations of all stored SCSRs on the mine maps required by §§75.1200 and 75.1505 of this part.

[71 FR 71454, Dec. 8, 2006]

30 CFR §75.1714-6

Emergency tethers.

At least one tether, which is a durable rope or equivalent material designed to permit members of a mine crew to link together while evacuating the mine during an emergency,

shall be provided and stored with the additional SCSRs on the fixed work location and on the mobile equipment required in §§75.1714-4(a)(1) and (b) of this part.

[71 FR 71454, Dec. 8, 2006]

30 CFR §75.1714-7

Multi-gas detectors.

(a) *Availability.* A mine operator shall provide an MSHA-approved, handheld, multi-gas detector that can measure methane, oxygen, and carbon monoxide to each group of underground miners and to each person who works alone, such as pumpers, examiners, and outby miners.

(b) *Qualified person.* At least one person in each group of underground miners shall be a qualified person under §75.150 of this part and each person who works alone shall be trained to use the multi-gas detector.

(c) *Maintenance and calibration.* Multi-gas detectors shall be maintained and calibrated as specified in §75.320 of this part.

[71 FR 71454, Dec. 8, 2006]

30 CFR §75.1714-8

Reporting SCSR inventory and malfunctions; retention of SCSRs.

(a) *SCSR inventory.* A mine operator shall submit to MSHA a complete inventory of all SCSRs at each mine. New mines shall submit the inventory within 3 months of beginning operation.

(1) The inventory shall include—

(i) Mine name, MSHA mine ID number, and mine location; and

(ii) For each SCSR unit, the manufacturer, the model type, the date of manufacture, and the serial number.

(2) In the event that a change in the inventory occurs, a mine operator shall report the change to MSHA within the quarter that the change occurs (Jan-Mar, Apr-Jun, Jul-Sep, Oct-Dec).

(b) *Reporting SCSR problems.* A mine operator shall report to MSHA any defect, performance problem, or malfunction with the use of an SCSR. The report shall include a detailed description of the problem and, for each SCSR involved, the information required by paragraph (a)(1) of this section.

(c) *Retention of problem SCSRs.* The mine operator shall preserve and retain each SCSR reported under paragraph (b) of this section for 60 days after reporting the problem to

MSHA.

[71 FR 71454, Dec. 8, 2006]

30 CFR §75.1715

Identification check system.

Each operator of a coal mine shall establish a check-in and check-out system which will provide positive identification of every person underground, and will provide an accurate record of the persons in the mine kept on the surface in a place chosen to minimize the danger of destruction by fire or other hazard. Such record shall bear a number identical to an identification check that is securely fastened to the lamp belt worn by the person underground. The identification check shall be made of a rust resistant metal of not less than 16 gauge.

30 CFR §75.1716

Operations under water.

Whenever an operator mines coal from a coal mine opened after March 30, 1970, or from any new working section of a mine opened prior to such date, in a manner that requires the construction, operation, and maintenance of tunnels under any river, stream, lake, or other body of water, that is, in the judgment of the Secretary, sufficiently large to constitute a hazard to miners, such operator shall obtain a permit from the Secretary which shall include such terms and conditions as he deems appropriate to protect the safety of miners working or passing through such tunnels from caveins and other hazards. Such permits shall require, in accordance with a plan to be approved by the Secretary, that a safety zone be established beneath and adjacent to such body of water. No plan shall be approved unless there is a minimum of cover to be determined by the Secretary, based on test holes drilled by the operator in a manner to be prescribed by the Secretary. No such permit shall be required in the case of any new working section of a mine which is located under any water resource reservoir being constructed by a Federal agency on December 30, 1969, the operator of which is required by such agency to operate in a manner that protects the safety of miners working in such section from cave-ins and other hazards.

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14696, Apr. 6, 1982; 60 FR 33719, June 29, 1995]

30 CFR §75.1716-1

Operations under water; notification by operator.

An operator planning to mine coal from coal mines opened after March 30, 1970, or from working sections in mines opened prior to such date, and in such manner that mining operations will be conducted, or tunnels constructed, under any river, stream, lake, or other body of water, shall give notice to the Coal Mine Safety District Manager in the

district in which the mine is located prior to the commencement of such mining operations.

30 CFR §75.1716-2

Permit required.

If in the judgment of the Coal Mine Safety District Manager the proposed mining operations referred to in §75.1716-1 constitute a hazard to miners, he shall promptly so notify the operator that a permit is required.

30 CFR §75.1716-3

Applications for permits.

An application for a permit required under this section shall be filed with the Coal Mine Safety District Manager and shall contain the following general information:

(a) Name and address of the company.

(b) Name and address of the mine.

(c) Projected mining and ground support plans.

(d) A mine map showing the locations of the river, stream, lake, or other body of water and its relation to the location of all working places.

(e) A profile map showing the type of strata and the distance in elevation between the coal bed and the river, stream, lake or other body of water involved. The type of strata shall be determined by core test drill holes as prescribed by the Coal Mine Safety District Manager.

30 CFR §75.1716-4

Issuance of permits.

If the Coal Mine Safety District Manager determines that the proposed mining operations under water can be safely conducted, he shall issue a permit for the conduct of such operations under such conditions as he deems necessary to protect the safety of miners engaged in those operations.

30 CFR §75.1717

Exemptions.

No notice under §75.1716-1 and no permit under §75.1716-2 shall be required in the case of any new working section of a mine which is located under any water resource reservoir being constructed by a Federal agency as of December 30, 1969, and where the

operator is required by such agency to operate in a manner that adequately protects the safety of miners.

30 CFR §75.1718

Drinking water.

An adequate supply of potable water shall be provided for drinking purposes in the active workings of the mine, and such water shall be carried, stored, and otherwise protected in sanitary containers.

30 CFR §75.1718-1

Drinking water; quality.

(a) Potable water provided in accordance with the provisions of §75.1718 shall meet the applicable minimum health requirements for drinking water established by the State or community in which the mine is located.

(b) Where no state or local health requirements apply to drinking water or where no state or local minimum health requirements exist, drinking water provided in accordance with the provisions of §75.1718 shall contain a minimum of 0.2 milligrams of free chlorine per liter of water.

30 CFR §75.1719

Illumination; purpose and scope of §§75.1719 through 75.1719-4; time for compliance.

(a) Section 317(e) of the Act (30 U.S.C. 877(e)) directs and authorizes the Secretary to propose and promulgate standards under which all working places in a mine shall be illuminated by permissible lighting while persons are working in such places §§75.1719 through 75.1719-4 prescribe the requirements for illumination of working places in underground coal mines while persons are working in such places and while self-propelled mining equipment is operated in the working place.

(b) Mine operators shall comply with §§75.1719 through 75.1719-4 not later than July 1, 1978.

[41 FR 43534, Oct. 1, 1976, as amended at 43 FR 13564, Mar. 31, 1978]

See MSHA's Program Policy Manual

30 CFR §75.1719-1

Illumination in working places.

(a) Each operator of an underground coal mine shall provide each working place in the

mine with lighting as prescribed in §§75.1719-1 and 75.1719-2 while self-propelled mining equipment is operated in the working place.

(b) *Self-propelled mining equipment; definition.* For the purposes of §§75.1719 through 75.1719-4, "self-propelled mining equipment" means equipment which possesses the capability of moving itself or its associated components from one location to another by electric, hydraulic, pneumatic, or mechanical power supplied by a source located on the machine or transmitted to the machine by cables, ropes, or chains.

(c) The lighting prescribed in this section shall be in addition to that provided by personal cap lamps.

(d) The luminous intensity (surface brightness) of surfaces that are in a miner's normal field of vision of areas in working places that are required to be lighted shall be not less than 0.06 footlamberts when measured in accordance with §75.1719-3.

(e) When self-propelled mining equipment specified in paragraphs (e)(1) through (e)(6) of this section is operated in a working place, the areas within a miner's normal field of vision which shall be illuminated in the working place shall be as prescribed in paragraphs (e)(1) through (e)(6) of this section.

(1) *Continuous miners and coal-loading equipment.* In working places in which continuous miners and coal-loading equipment are operated, the areas which shall be illuminated shall be as follows:

(i) The face, and

(ii) The ribs, roof, floor, and exposed surface of mining equipment, which are between the face and the inby end of the shuttle car or other conveying equipment while in position to receive material.

(2) *Self-loading haulage equipment used as a loading machine.* In working places in which self-loading haulage equipment is operated to load material, the areas which shall be illuminated shall be as follows:

(i) The face, and

(ii) The ribs, roof, floor, and exposed surfaces of mining equipment, which are between the face and a point 5 feet outby the machine.

(3) *Cutting and drilling equipment.* In working places in which cutting or drilling equipment is operated, the areas which shall be illuminated shall be as follows:

(i) The ribs, roof, floor, and exposed surfaces of mining equipment, which are between the face and a point 5 feet outby the machine.

(4) *Shortwall and longwall mining equipment.* In working places in which Shortwall or longwall mining equipment is operated, the areas which shall be illuminated shall be as follows:

(i) The area for the length of the self-advancing roof support system and which is between the gob-side of the travelway and the side of the block of coal from which coal is being extracted, and

(ii) The control station, and the head piece and tail piece of the face conveyor, and

(iii) The roof and floor for a distance of 5 feet horizontally from the control station, head piece and tail piece.

(5) *Roof bolting equipment.* In working places in which roof bolting equipment is operated, the areas which shall be illuminated shall be as follows:

(i) *Where the distance from the floor, to the roof is 5 feet, or less:* the face, ribs, roof, floor, and exposed surfaces of mining equipment, which are within an area the perimeter of which is a distance of 5 feet from the machine, when measured parallel to the floor.

(ii) *Where the distance from the floor to the roof is more than 5 feet:* the face, ribs, roof, floor, and exposed surfaces of mining equipment, which are within an area the perimeter of which from the front and sides of the machine is a distance equal to the distance from the floor to the roof and from the rear of the machine a distance of 5 feet, when measured parallel to the floor.

(6) *Other self-propelled equipment.* Unless the entire working place is illuminated by stationary lighting equipment, in working places in which self-propelled equipment is operated, other than equipment specified in paragraphs (e)(1) through (e)(5) of this section, illumination shall be provided as follows:

(i) Luminaires shall be installed on each machine operated in the working place which shall illuminate a face or rib coal surface which is within 10 feet of the front and the rear of the machine to a luminous intensity of not less than 0.06 footlamberts, and

(ii) The height and width of the area of the coal surface which shall be illuminated shall equal the height and width, respectively, of the machine on which the luminaires are installed, and

(iii) The luminaires in the direction of travel shall be operated at all times the equipment is being trammed in the working place.

(f) The Administrator, Coal Mine Safety, MSHA, may specify other areas in a working place to be illuminated for the protection of miners while self-propelled mining equipment is being operated in the working place.

(g) Surface brightness of floor, roof, coal and machine surfaces in the normal visual field of a miner shall not vary more than 50 percent between adjacent fields of similar surface reflectance, and the maximum surface brightness of such surface shall not exceed 120 footlamberts when measured in accordance with §75.1719-3.

[41 FR 43534, Oct. 1, 1976, as amended at 42 FR 18859, Apr. 11, 1977; 43 FR 43458, Sept. 26, 1978; 47 FR 28096, June 29, 1982]

30 CFR §75.1719-2

Lighting fixtures; requirements.

(a) Lighting fixtures shall be permissible.

(b) Lighting fixtures may be installed on self-propelled machines or may be stationary lighting fixtures.

(c)(1) Electrically operated lighting fixtures shall be energized by direct current, or by sinusoidal full wave alternating current not less than 50 cycles per second (100 pulses per second), or by an equivalent power source that causes no greater flicker.

(2) Alternating current circuits supplying power to stationary lighting fixtures shall contain conductors energized at voltages not greater than 70 volts to ground. Alternating current circuits, energized at 100 volts or more and used to supply power to stationary lighting fixtures, shall originate at a transformer having a center or neutral tap grounded to earth through a proper resistor, which shall be designed to limit fault current to not more than 5 amperes. A grounding circuit in accordance with §75.701-4 shall originate at the grounded terminal of the grounding resistor and extend along with the power conductors and serve as a grounding conductor for the frames of all equipment receiving power from the circuit. The ground fault current rating of grounding resistors shall meet the "extended time rating" set forth in the Institute of Electrical and Electronics Engineers, Inc. Standard No. 32 (IEEE Std. 32-1972) which is hereby incorporated by reference and made a part hereof. The incorporated publication is available for examination at each MSHA Coal Mine Safety and Health district office, and may be obtained from the Institute of Electrical and Electronics Engineers, Inc., Publications Office, 10662 Los Vaqueros Circle, P.O. Box 3014 Los Alamitos, CA 90720-1264 Telephone: 800-272-6657 (toll free); http://www.ieee.org.

(3) Machine-mounted lighting fixtures shall be electrically grounded to the machine by a separate grounding conductor in compliance with §75.701-4.

(d) Direct current circuits in excess of a nominal voltage of 300 volts shall not be used to supply power to stationary light fixtures.

(e) Cables conducting power to stationary lighting fixtures from both alternating and direct current power sources, other than intrinsically safe devices, shall be considered trailing cables, and shall meet the requirements of Subpart G of this part. In addition, such cables shall be protected against overloads and short circuits by a suitable circuit breaker or other device approved by the Secretary. Circuit breakers or other device approved by the Secretary protecting trailing cables receiving power from resistance grounded circuits shall be equipped with a ground trip arrangement which shall be designed to de-energize the circuit at not more than 50% of the available fault current.

(f) Before shunts are removed from blasting caps, lighting fixtures and associated cables located in the same working place shall be de-energized. Furthermore, lighting fixtures shall be removed out of the line of blast and not less than 50 feet from the blasting operation unless otherwise protected against flying debris.

(g) Lighting fixtures shall be designed and installed to minimize discomfort glare.

[41 FR 43534, Oct. 1, 1976, as amended at 71 FR 16669, Apr. 3, 2006]

30 CFR §75.1719-3

Methods of measurement; light measuring instruments.

(a) Compliance with §75.1719-1(d) shall be determined by MSHA by measuring luminous intensity (surface brightness).

(b) In measuring luminous intensity the following procedures shall be used:

(1) In areas of working places specified in §§75.1719-1(e)(1) through 75.1719-1(e)(3) luminous intensity measurements of the face, ribs, roof, floor, and exposed surfaces of mining equipment, shall be made with the machine idle and located in the approximate center of the working place with the cutting, loading, or drilling head toward the face and not more than 3 feet from the face.

(2) In areas of working places specified in §75.1719-1(e)(4) luminous intensity measurements may be made at any time longwall or shortwall mining equipment is operated except that when measurements are made in the vicinity of shearers, plows, or continuous miners, the equipment shall be idle while measurements are being made.

(3) In areas of working places specified in §75.1719-1(e)(5) luminous intensity measurements of the face, ribs, roof, floor, and exposed surfaces of mining equipment, shall be made with the machine idle and located in the approximate center of the working place with the drilling head toward the face and a distance from the face of 5 feet, or the distance from the floor to the roof, whichever is applicable. When the machine is located in the center of the working place and the surfaces of the ribs to be illuminated are not within the perimeter of the area determined in accordance with §75.1719-1(e)(5), the machine shall be positioned the applicable distance from the face and each rib and luminous intensity measurements made for each rib, provided, however, that luminous intensity measurements may be made of the face, roof, floor, and exposed surfaces of mining equipment with the machine so located without locating the machine in the center of the working place.

(4) In areas of working places specified in §75.1719-1(e)(6), luminous intensity measurements of a coal surface shall be made with the machine idle and located in the approximate center of the working place with the appropriate end toward the face and

not less than 9 feet nor more than 10 feet from the face.

(5) The area of surfaces to be measured shall be divided into round or square fields having an area of not less than 3 nor more than 5 square feet as illustrated by the following figure:

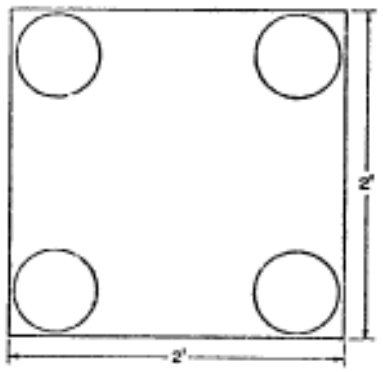
DIRECT MEASUREMENT OF LUMINOUS INTENSITY

DIRECT MEASUREMENT OF LUMINOUS INTENSITY

(6) Measurements shall be taken with the photometer held approximately perpendicular to the surface being measured and a sufficient distance from the surface to allow the light sensing element in the instrument to receive reflected light from a field of not less than 3 nor more than 5 square feet. The luminous intensity of each such field shall be not less than 0.06 footlambert.

(7) In areas of working places where clearances are restricted to the extent that the photometer cannot be held a sufficient distance from the surface to allow the light sensing element in the instrument to receive reflected light from a field having an area of at least 3 square feet, luminous intensity shall be considered as the average of four uniformly spaced readings taken at the corners and within a square field having an area of approximately 4 square feet. In such instances, the area of each of the individual readings shall not exceed 100 square inches. The average of the four readings shall be not less than 0.06 footlambert. The method of measurement is illustrated by the following figure:

DETERMINATION OF LUMINOUS INTENSITY BY AVERAGING METHOD



DETERMINATION OF LUMINOUS INTENSITY
BY AVERAGING METHOD

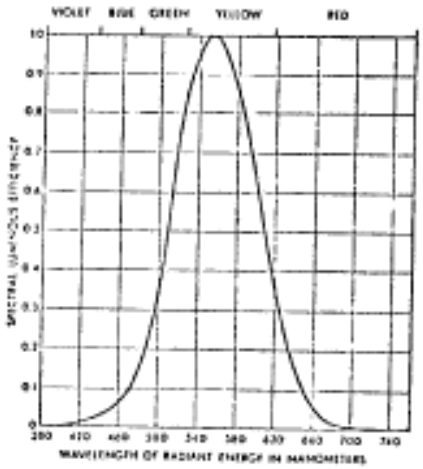
(8) Measurements shall not be made where shadows are cast by roof control posts, ventilation equipment, or other obstructions necessary to insure safe mining conditions.

(9) Where machine-mounted light fixtures are used on equipment, except self advancing roof support systems, measurements shall not be made of surfaces on or within 1 foot of a self-propelled machine.

(c) For the purpose of making illumination measurements, an authorized representative of the Secretary may require the installation of temporary roof supports or the removal of the equipment to a similar working place in which permanent roof supports have been installed.

(d) Light measuring instruments shall be properly calibrated and maintained. Instruments shall be calibrated against standards traceable to the National Bureau of Standards and color corrected to the Commission Internationale de l'Eclairage (CIE) Spectral Luminous Curve. The CIE Spectral Luminous Curve is as follows:

LUMINOUS CURVE



30 CFR §75.1719-4

Mining machines, cap lamps; requirements.

(a) Paint used on exterior surfaces of mining machines shall have a minimum reflectance of 30 percent, except cab interiors and other surfaces which might adversely affect visibility.

(b) When stationary light fixtures are used, red reflectors mounted in protective frames or reflecting tape shall be installed on each end of mining machines, except that continuous mining machines, loaders, and cutters need only have such reflectors or tape on the outby end. Reflectors or reflecting tape shall have an area of not less than 10 square inches.

(c) Each person who goes underground shall be required to wear an approved personal cap lamp or an equivalent portable light.

(d) Each person who goes underground shall be required to wear a hard hat or hard cap which shall have a minimum of 6 square inches of reflecting tape or equivalent paint or material on each side and back.

[41 FR 43534, Oct. 1, 1976]

30 CFR §75.1720

Protective clothing; requirements.

On and after the effective date of this §75.1720 each miner regularly employed in the active workings of an underground coal mine shall be required to wear the following protective clothing and devices:

(a) Protective clothing or equipment and face-shields or goggles when welding, cutting,

or working with molten metal or when other hazards to the eyes exist from flying particles.

(b) Suitable protective clothing to cover those parts of the body exposed to injury when handling corrosive or toxic substances or other materials which might cause injury to the skin.

(c) Protective gloves when handling materials or performing work which might cause injury to the hands; however, gloves shall not be worn where they would create a greater hazard by becoming entangled in the moving parts of equipment.

(d) A suitable hard hat or hard cap. If a hard hat or hard cap is painted, nonmetallic based paint shall be used.

(e) Suitable protective footwear.

[36 FR 19497, Oct. 7, 1971, as amended at 39 FR 7175, Feb. 25, 1974]

30 CFR §75.1720-1

Distinctively colored hard hats, or hard caps; identification for newly employed, inexperienced miners.

Hard hats or hard caps distinctively different in color from those worn by experienced miners shall be worn by each newly employed, inexperienced miner for at least one year from the date of his initial employment as a miner or until he has been qualified or certified as a miner by the State in which he is employed.

[39 FR 7175, Feb. 25, 1974]

30 CFR §75.1721

Opening of new underground coal mines, or reopening and reactivating of abandoned or deactivated coal mines, notification by the operator; requirements.

(a) Each operator of a new underground coal mine, and a mine which has been abandoned or deactivated and is to be reopened or reactivated, shall prior to opening, reopening or reactivating the mine notify the Coal Mine Safety and Health District Manager for the district in which the mine is located of the approximate date of the proposed or actual opening of such mine. Thereafter, and as soon as practicable, the operator of such mine shall submit all preliminary plans in accordance with paragraphs (b) and (c) of this section to the District Manager and the operator shall not develop any part of the coalbed in such mine unless and until all preliminary plans have been approved.

(b) The preliminary plans required to be submitted by the operator to the District Manager shall be in writing and shall contain the following:

(1) The name and location of the proposed mine and the Mine Safety and Health Administration mine identification number, if known;

(2) The name and address of the mine operator(s);

(3) The name and address of the principal official designated by the operator as the person who is in charge of health and safety at the mine;

(4) The identification and approximate height of the coalbed to be developed;

(5) The system of mining to be employed;

(6) A proposed roof control plan containing the information specified in §75.220.

(7) A proposed mine ventilation plan containing the information specified in §§75.371 and 75.372;

(8) A proposed plan for sealing worked-out areas containing the information specified in §§75.371 and 75.372.

(9) A proposed program for searching miners for smoking materials in accordance with the provisions of §75.1702; and,

(10) A proposed plan for emergency medical assistance and emergency communication in accordance with the provisions of §§75.1713-1 and 75.1713-2.

(c) The preliminary plans required to be submitted by the operator to the District Manager shall be in writing and shall contain the following:

(1) The proposed training plan containing the information specified in §§48.3 and 48.23 of this chapter, and

(2) A proposed plan for training and retraining certified and qualified persons containing the information specified in §75.160-1.

[44 FR 9380, Feb. 13, 1979, as amended at 47 FR 23641, May 28, 1982; 57 FR 20929, May 15, 1992]

30 CFR §75.1722

Mechanical equipment guards.

(a) Gears; sprockets; chains; drive, head, tail, and takeup pulleys; flywheels; couplings, shafts; sawblades; fan inlets; and similar exposed moving machine parts which may be contacted by persons, and which may cause injury to persons shall be guarded.

(b) Guards at conveyor-drive, conveyor-head, and conveyor-tail pulleys shall extend a

distance sufficient to prevent a person from reaching behind the guard and becoming caught between the belt and the pulley.

(c) Except when testing the machinery, guards shall be securely in place while machinery is being operated.

[38 FR 4976, Feb. 23, 1973]

30 CFR §75.1723

Stationary grinding machines; protective devices.

(a) Stationary grinding machines other than special bit grinders shall be equipped with:

(1) Peripheral hoods (less than 90° throat openings) capable of withstanding the force of a bursting wheel.

(2) Adjustable tool rests set as close as practical to the wheel.

(3) Safety washers.

(b) Grinding wheels shall be operated within the specifications of the manufacturer of the wheel.

(c) Face shields or goggles, in good condition, shall be worn when operating a grinding wheel.

[38 FR 4976, Feb. 23, 1973

30 CFR §75.1724

Hand-held power tools; safety devices.

Hand-held power tools shall be equipped with controls requiring constant hand or finger pressure to operate the tools or shall be equipped with friction or other equivalent safety devices.

[38 FR 4976, Feb. 23, 1973]

30 CFR §75.1725

Machinery and equipment; operation and maintenance.

(a) Mobile and stationary machinery and equipment shall be maintained in safe operating condition and machinery or equipment in unsafe condition shall be removed from service immediately.

(b) Machinery and equipment shall be operated only by persons authorized to operate

such machinery or equipment.

(c) Repairs or maintenance shall not be performed on machinery until the power is off and the machinery is blocked against motion, except where machinery motion is necessary to make adjustments.

(d) Machinery shall not be lubricated manually while in motion, unless equipped with extended fittings or cups.

[38 FR 4976, Feb. 23, 1973]

30 CFR §75.1726

Performing work from a raised position; safeguards.

(a) Men shall not work on or from a piece of mobile equipment in a raised position until it has been blocked in place securely. This does not preclude the use of equipment specifically designed as elevated mobile work platforms.

(b) No work shall be performed under machinery or equipment that has been raised until such machinery or equipment has been securely blocked in position.

[38 FR 4976, Feb. 23, 1973]

30 CFR §75.1727

Drive belts.

(a) Drive belts shall not be shifted while in motion unless the machines are provided with mechanical shifters.

(b) Belt dressing shall not be applied while belts are in motion except where it can be applied without endangering a person.

[38 FR 4976, Feb. 23, 1973]

30 CFR §75.1728

Power-driven pulleys.

(a) Belts, chains, and ropes shall not be guided onto power-driven moving pulleys, sprockets, or drums with the hands except on slow-moving equipment especially designed for hand feeding.

(b) Pulleys of conveyors shall not be cleaned manually while the conveyor is in motion.

(c) Coal spilled beneath belt conveyor drives or tail pieces shall not be removed while the conveyor is in motion, except where such coal can be removed without endangering

persons.

[38 FR 4976, Feb. 23, 1973]

30 CFR §75.1729

Welding operations.

Welding operations shall be shielded and the area shall be well ventilated.

[38 FR 4976, Feb. 23, 1973]

30 CFR §75.1730

Compressed air; general; compressed air systems.

(a) All pressure vessels shall be constructed, installed, and maintained in accordance with the standards and specifications of Section VIII "Unfired Pressure Vessels," of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (1971), which is hereby incorporated by reference and made a part hereof. This document may be purchased for $25 from the American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017; and it is available for examination in every Coal Mine Safety and Health District and Subdistrict Office.

(b) Compressors and compressed-air receivers shall be equipped with automatic pressure-relief valves, pressure gages, and drain valves.

(c) Repairs involving the pressure system of compressors, receivers, or compressed-air-powered equipment shall not be attempted until the pressure has been relieved from that part of the system to be repaired.

(d) At no time shall compressed air be directed toward a person. When compressed air is used, all necessary precautions shall be taken to protect persons from injury.

(e) Safety chains, suitable locking devices, or automatic cut-off valves shall be used at connections to machines of high-pressure hose lines of three-fourths of an inch inside diameter or larger, and between high-pressure hose lines of three-fourths of an inch inside diameter or larger, where a connection failure would create a hazard. For purposes of this paragraph, high-pressure means pressure of 100 p.s.i. or more.

[38 FR 4976, Feb. 23, 1973] Subpart S Approved Books and Records (Reserved)

30 CFR §75.1731

Maintenance of belt conveyors and belt conveyor entries.

(a) Damaged rollers, or other damaged belt conveyor components, which pose a fire hazard must be immediately repaired or replaced. All other damaged rollers, or other damaged belt

conveyor components, must be repaired or replaced.

(b) Conveyor belts must be properly aligned to prevent the moving belt from rubbing against the structure or components.

(c) Materials shall not be allowed in the belt conveyor entry where the material may contribute to a frictional heating hazard.

(d) Splicing of any approved conveyor belt must maintain flame-resistant properties of the belt.

[73 FR 80616, Dec. 31, 2008]

30 CFR §75.1732

Proximity detection systems.

Operators must install proximity detection systems on certain mobile machines.

(a) Machines covered. Operators must equip continuous mining machines, except full-face continuous mining machines, with proximity detection systems by the following dates. For proximity detection systems with miner-wearable components, the mine operator must provide a miner-wearable component to be worn by each miner on the working section by the following dates.

(1) Continuous mining machines manufactured after March 16, 2015 must meet the requirements in this section no later than November 16, 2015. These machines must meet the requirements in this section when placed in service with a proximity detection system.

(2) Continuous mining machines manufactured and equipped with a proximity detection system on or before March 16, 2015 must meet the requirements in this section no later than September 16, 2016.

(3) Continuous mining machines manufactured and not equipped with a proximity detection system on or before March 16, 2015 must meet the requirements in this section no later than March 16, 2018. These machines must meet the requirements in this section when placed in service with a proximity detection system.

(b) Requirements for a proximity detection system. A proximity detection system includes machine-mounted components and miner-wearable components. The system must:

(1) Cause a machine, which is tramming from place-to-place or repositioning, to stop before contacting a miner except for a miner who is in the on-board operator's compartment;

(2) Provide an audible and visual warning signal on the miner-wearable component and a visual warning signal on the machine that alert miners before the system causes a

machine to stop. These warning signals must be distinguishable from other signals;

(3) Provide a visual signal on the machine that indicates the machine-mounted components are functioning properly;

(4) Prevent movement of the machine if any machine-mounted component of the system is not functioning properly. However, a system with any machine-mounted component that is not functioning properly may allow machine movement if it provides an audible or visual warning signal, distinguishable from other signals, during movement. Such movement is permitted only for purposes of relocating the machine from an unsafe location for repair;

(5) Be installed to prevent interference that adversely affects performance of any electrical system; and

(6) Be installed and maintained in proper operating condition by a person trained in the installation and maintenance of the system.

(c) Proximity detection system checks. Operators must:

(1) Designate a person who must perform a check of machine-mounted components of the proximity detection system to verify that components are intact, that the system is functioning properly, and take action to correct defects—

(i) At the beginning of each shift when the machine is to be used; or

(ii) Immediately prior to the time the machine is to be operated if not in use at the beginning of a shift; or

(iii) Within 1 hour of a shift change if the shift change occurs without an interruption in production.

(2) Check for proper operation of miner-wearable components at the beginning of each shift that the components are to be used and correct defects before the components are used.

(d) Certifications and records. The operator must make and retain certifications and records as follows:

(1) At the completion of the check of machine-mounted components required under paragraph (c)(1) of this section, a certified person under §75.100 must certify by initials, date, and time that the check was conducted. Defects found as a result of the check, including corrective actions and dates of corrective actions, must be recorded before the end of the shift;

(2) Make a record of the defects found as a result of the check of miner-wearable components required under paragraph (c)(2) of this section, including corrective actions and dates of corrective actions;

(3) Make a record of the persons trained in the installation and maintenance of proximity detection systems required under paragraph (b)(6) of this section;

(4) Maintain records in a secure book or electronically in a secure computer system not susceptible to alteration; and

(5) Retain records for at least one year and make them available for inspection by authorized representatives of the Secretary and representatives of miners.

Subpart T – Diesel Powered Equipment

30 CFR §75.1900

Definitions.

The following definitions apply in this subpart.

Diesel fuel tank. A closed metal vessel specifically designed for the storage or transport of diesel fuel.

Diesel fuel transportation unit. A self-propelled or portable wheeled vehicle used to transport a diesel fuel tank.

Noncombustible material. A material that will continue to serve its intended function for 1 hour when subjected to a fire test incorporating an ASTM E119-88 time/temperature heat input, or equivalent. The publication ASTM E119-88 "Standard Test Methods for Fire Tests of Building Construction and Materials" is incorporated by reference and may be inspected at any MSHA Coal Mine Safety and Health District Office; at MSHA's Office of Standards, Regulations, and Variances, 201 12th Street South, Arlington, VA 22202-5452; 202-693-9440; or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal__register/code__of__federal__regulations/ibr__locations.html. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. In addition, copies of the document may be purchased from the American Society for Testing and Materials (ASTM), 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA, 19428-2959; 610-832-9500; http://www.astm.org.

Permanent underground diesel fuel storage facility. A facility designed and constructed to remain at one location for the storage or dispensing of diesel fuel, which does not move as mining progresses.

Safety can. A metal container intended for storage, transport or dispensing of diesel fuel, with a nominal capacity of 5 gallons, listed or approved by a nationally recognized independent testing laboratory.

Temporary underground diesel fuel storage area. An area of the mine provided for the short-term storage of diesel fuel in a fuel transportation unit, which moves as mining progresses.

[35 FR 17890, Nov. 20, 1970, as amended at 67 FR 38386, June 4, 2002; 71 FR 16669, Apr. 3, 2006; 80 FR 52992, Sept. 2, 2015]

30 CFR §75.1901

Diesel fuel requirements.

(a) Diesel-powered equipment shall be used underground only with a diesel fuel having a sulfur content no greater than 0.05 percent and a flash point of 100 deg. F (38 deg. C) or greater. Upon request, the mine operator shall provide to an authorized representative of the Secretary evidence that the diesel fuel purchased for use in diesel- powered equipment underground meets these requirements.

(b) Flammable liquids shall not be added to diesel fuel used in diesel-powered equipment underground.

(c) Only diesel fuel additives that have been registered by the Environmental Protection Agency may be used in diesel-powered equipment underground.

30 CFR §75.1902

Underground diesel fuel storage--general requirements.

(a) All diesel fuel must be stored in:

(1) Diesel fuel tanks in permanent underground diesel fuel storage facilities;

(2) Diesel fuel tanks on diesel fuel transportation units in permanent underground diesel fuel storage facilities or in temporary underground fuel storage areas; or

(3) Safety cans.

(b) The total capacity of stationary diesel fuel tanks in permanent underground diesel fuel storage facilities must not exceed 1000 gallons.

(c)(1) Only one temporary underground diesel fuel storage area is permitted for each working section or in each area of the mine where equipment is being installed or removed.

(2) The temporary underground diesel fuel storage area must be located--

(i) Within 500 feet of the loading point;

(ii) Within 500 feet of the projected loading point where equipment is being installed; or

(iii) Within 500 feet of the last loading point where equipment is being removed.

(3) No more than one diesel fuel transportation unit at a time shall be parked in the temporary underground diesel fuel storage area.

(d) Permanent underground diesel fuel storage facilities and temporary underground diesel fuel storage areas must be--

(1) At least 100 feet from shafts, slopes, shops, or explosives magazines;

(2) At least 25 feet from trolley wires or power cables, or electric equipment not necessary for the operation of the storage facilities or areas; and

(3) In a location that is protected from damage by other mobile equipment.

(e) Permanent underground diesel fuel storage facilities must not be located within the primary escapeway.

30 CFR §75.1903

Underground diesel fuel storage facilities and areas; construction and safety precautions.

(a) Permanent underground diesel fuel storage facilities must be--

(1) Constructed of noncombustible materials, including floors, roofs, roof supports, doors, and door frames. Exposed coal within fuel storage areas must be covered with noncombustible materials. If bulkheads are used they must be tightly sealed and must be built of or covered with noncombustible materials;

(2) Provided with either self-closing doors or a means for automatic enclosure;

(3) Provided with a means for personnel to enter and exit the facility after closure;

(4) Ventilated with intake air that is coursed into a return air course or to the surface and that is not used to ventilate working places, using ventilation controls meeting the requirements of Sec. 75.333(e);

(5) Equipped with an automatic fire suppression system that meets the requirements of Sec. 75.1912. Actuation of the automatic fire suppression system shall initiate the means for automatic enclosure;

(6) Provided with a means of containment capable of holding 150 percent of the maximum capacity of the fuel storage system; and

(7) Provided with a competent concrete floor or equivalent to prevent fuel spills from saturating the mine floor.

(b) Permanent underground diesel fuel storage facilities and temporary underground diesel fuel storage areas must be--

(1) Equipped with at least 240 pounds of rock dust and provided with two portable multipurpose dry chemical type (ABC) fire extinguishers that are listed or approved by a nationally recognized independent testing laboratory and have a 10A:60B:C or higher rating. Both fire extinguishers must be easily accessible to personnel, and at least one fire extinguisher must be located outside of the storage facility or area upwind of the facility, in intake air; or

(2) Provided with three portable multipurpose dry chemical type (ABC) fire extinguishers that are listed or approved by a nationally recognized independent testing laboratory and have a 10A:60B:C or higher rating. All fire extinguishers must be easily accessible to personnel, and at least one fire extinguisher must be located outside of the storage facility or area upwind of the facility, in intake air.

(3) Identified with conspicuous markings designating diesel fuel storage; and

(4) Maintained to prevent the accumulation of water.

(c) Welding or cutting other than that performed in accordance with paragraph (d) of this section shall not be performed within 50 feet of a permanent underground diesel fuel storage facility or a temporary underground diesel fuel storage area.

(d) When it is necessary to weld, cut, or solder pipelines, tanks, or other containers that may have contained diesel fuel, these practices shall be followed:

(1) Cutting or welding shall not be performed on or within pipelines, tanks, or other containers that have contained diesel fuel until they have been thoroughly purged and cleaned or made inert and a vent or opening is provided to allow for sufficient release of any buildup pressure before heat is applied.

(2) Diesel fuel shall not be allowed to enter pipelines, tanks, or containers that have been welded, soldered, brazed, or cut until the metal has cooled to ambient temperature.

30 CFR §75.1904

Underground diesel fuel tanks and safety cans.

(a) Diesel fuel tanks used underground shall--

(1) Have steel walls of a minimum 3/16-inch thickness, or walls made of other metal of a thickness that provides equivalent strength;

(2) Be protected from corrosion;

(3) Be of seamless construction or have liquid tight welded seams;

(4) Not leak; and

(5) For stationary tanks in permanent underground diesel fuel storage facilities, be placed on supports constructed of noncombustible material so that the tanks are at least 12 inches above the floor.

(b) Underground diesel fuel tanks must be provided with--

(1) Devices for emergency venting designed to open at a pressure not to exceed 2.5 psi according to the following—

(i) Tanks with a capacity greater than 500 gallons must have an emergency venting device whose area is equivalent to a pipe with a nominal inside diameter of 5 inches or greater; and

(ii) Tanks with a capacity of 500 gallons or less must have an emergency venting device whose area is equivalent to a pipe with a nominal inside diameter of 4 inches or greater.

(2) Tethered or self-closing caps for stationary tanks in permanent underground diesel fuel storage facilities and self-closing caps for diesel fuel tanks on diesel fuel transportation units;

(3) Vents to permit the free discharge of liquid, at least as large as the fill or withdrawal connection, whichever is larger, but not less than 1⅓4 inch nominal inside diameter;

(4) Liquid tight connections for all tank openings that are—

(i) Identified by conspicuous markings that specify the function; and

(ii) Closed when not in use.

(5) Vent pipes that drain toward the tank without sagging and are higher than the fill pipe opening;

(6) Shutoff valves located as close as practicable to the tank shell on each connection through which liquid can normally flow; and

(7) An automatic closing, heat-actuated valve on each withdrawal connection below the liquid level.

(c) When tanks are provided with openings for manual gauging, liquid tight, tethered or self-closing caps or covers must be provided and must be kept closed when not open for gauging.

(d) Surfaces of the tank and its associated components must be protected against damage by collision.

(e) Before being placed in service, tanks and their associated components must be tested for leakage at a pressure equal to the working pressure, except tanks and components connected directly to piping systems, which must be properly designed for the application.

(f) Safety cans must be:

(1) Limited to a nominal capacity of 5 gallons or less;

(2) Equipped with a flexible or rigid tubular nozzle attached to a valved spout;

(3) Provided with a vent valve designed to open and close simultaneously and automatically with the opening and closing of the pouring valve; and

(4) Designed so that they will safely relieve internal pressure when exposed to fire.

30 CFR §75.1905

Dispensing of diesel fuel.

(a) Diesel-powered equipment in underground coal mines may be refueled only from safety cans, from tanks on diesel fuel transportation units, or from stationary tanks.

(b) Fuel that is dispensed from other than safety cans must be dispensed by means of--

(1) Gravity feed with a hose equipped with a nozzle with a self- closing valve and no latch-open device;

(2) A manual pump with a hose equipped with a nozzle containing a self-closing valve; or

(3) A powered pump with:

(i) An accessible emergency shutoff switch for each nozzle;

(ii) A hose equipped with a self-closing valve and no latch-open device; and

(iii) An anti-siphoning device.

(c) Diesel fuel must not be dispensed using compressed gas.

(d) Diesel fuel must not be dispensed to the fuel tank of diesel- powered equipment while the equipment engine is running.

(e) Powered pumps shall be shut off when fuel is not being dispensed.

30 CFR §75.1905-1

Diesel fuel piping systems.

(a) Diesel fuel piping systems from the surface must be designed and operated as dry systems, unless an automatic shutdown is incorporated that prevents accidental loss or spillage of fuel and that activates an alarm system.

(b) All piping, valves and fittings must be--

(1) Capable of withstanding working pressures and stresses;

(2) Capable of withstanding four times the static pressures;

(3) Compatible with diesel fuel; and

(4) Maintained in a manner that prevents leakage.

(c) Pipelines must have manual shutoff valves installed at the surface filling point, and at the underground discharge point.

(d) If diesel fuel lines are not buried in the ground sufficiently to protect them from damage, shutoff valves must be located every 300 feet.

(e) Shutoff valves must be installed at each branch line where the branch line joins the main line.

(f) An automatic means must be provided to prevent unintentional transfer of diesel fuel from the surface into the permanent underground diesel fuel storage facility.

(g) Diesel fuel piping systems from the surface shall only be used to transport diesel fuel directly to stationary tanks or diesel fuel transportation units in a permanent underground diesel fuel storage facility.

(h) The diesel fuel piping system must not be located in a borehole with electric power cables.

(i) Diesel fuel piping systems located in entries must not be located on the same side of the entry as electric cables or power lines. Where it is necessary for piping systems to cross electric cables or power lines, guarding must be provided to prevent severed electrical cables or power lines near broken fuel lines.

(j) Diesel fuel piping systems must be protected and located to prevent physical damage.

30 CFR §75.1906

Transport of diesel fuel.

(a) Diesel fuel shall be transported only by diesel fuel transportation units or in safety cans.

(b) No more than one safety can shall be transported on a vehicle at any time. The can must be protected from damage during transport. All other safety cans must be stored in permanent underground diesel fuel storage facilities.

(c) Safety cans that leak must be promptly removed from the mine.

(d) Diesel fuel transportation unit tanks and safety cans must be conspicuously marked as containing diesel fuel.

(e) Diesel fuel transportation units must transport no more than 500 gallons of diesel fuel at a time.

(f) Tanks on diesel fuel transportation units must be permanently fixed to the unit and have a total capacity of no greater than 500 gallons of diesel fuel.

(g) Non-self-propelled diesel fuel transportation units with electrical components for dispensing fuel that are connected to a source of electrical power must be protected by a fire suppression device that meets the requirements of Secs. 75.1107-3 through 75.1107-6, and Secs. 75.1107-8 through 75.1107-16.

(h) Diesel fuel transportation units and vehicles transporting safety cans containing diesel fuel must have at least two multipurpose, dry chemical type (ABC) fire extinguishers, listed or approved by a nationally recognized independent testing laboratory and having a 10A:60B:C or higher rating, with one fire extinguisher provided on each side of the vehicle.

(i) Diesel fuel transportation units shall be parked only in permanent underground diesel fuel storage facilities or temporary underground diesel fuel storage areas when not in use. When the distance between a diesel fuel transportation unit and an energized trolley wire at any location is less than 12 inches, the requirements of Sec. 75.1003-2 must be followed.

j) When the distance between a diesel fuel transportation unit and an energized trolley wire at any location is less than 12 inches, the requirements of §75.1003-2 must be followed.

(k) Diesel fuel shall not be transported on or with mantrips or on conveyor belts.

(l) Diesel fuel shall be stored and handled in accordance with the requirements of §§75.1902 through 75.1906 of this part as of November 25, 1997.

[61 FR 55527, Oct. 25, 1996, as amended at 63 FR 12647, Mar. 16, 1998]

30 CFR §75.1907

Diesel-powered equipment intended for use in underground coal mines.

(a) As of November 25, 1996 all diesel-powered equipment used where permissible electrical equipment is required must be approved under part 36 of this chapter.

(b) Diesel-powered equipment approved under part 36 of this chapter must be provided with additional safety features in accordance with the following time schedule:

(1) As of April 25, 1997 the equipment must have a safety component system that limits surface temperatures to those specified in subpart F of part 7 of this title;

(2) As of November 25, 1999 the equipment must have an automatic or manual fire suppression system that meets the requirements of §75.1911 of this part, and at least one portable multipurpose dry chemical type (ABC) fire extinguisher, listed or approved by a nationally recognized independent testing laboratory and having a 10A:60B:C or higher rating. The fire extinguisher must be located within easy reach of the equipment operator and be protected from damage by collision.

(3) As of November 25, 1999 the equipment must have a brake system that meets the requirements of §75.1909 (b)(6), (b)(7), (b)(8), (c), (d), and (e);

(4) As of November 25, 1997 a particulate index and dilution air quantity shall be determined for the equipment in accordance with subpart E of part 7 of this chapter; and

(5) Permissible diesel-powered equipment manufactured on or after November 25, 1999 and that is used in an underground coal mine shall incorporate a power package approved in accordance with part 7, subpart F of this chapter.

(c) As of November 25, 1999 non-permissible diesel-powered equipment, except the special category of equipment under §75.1908(d), shall meet the requirements of §§75.1909 and 75.1910 of this part.

30 CFR §75.1908

Non-permissible diesel-powered equipment--categories.

(a) Heavy-duty diesel-powered equipment includes--

(1) Equipment that cuts or moves rock or coal;

(2) Equipment that performs drilling or bolting functions;

(3) Equipment that moves longwall components;

(4) Self-propelled diesel fuel transportation units and self- propelled lube units; or

(5) Machines used to transport portable diesel fuel transportation units or portable lube units.

(b) Light-duty diesel-powered equipment is any diesel-powered equipment that does not meet the criteria of paragraph (a).

(c) For the purposes of this subpart, the following equipment is considered attended:

(1) Any machine or device operated by a miner; or

(2) Any machine or device that is mounted in the direct line of sight of a job site located within 500 feet of such machine or device, which job site is occupied by a miner.

(d) Diesel-powered ambulances and fire fighting equipment are a special category of equipment that may be used underground only in accordance with the mine fire fighting and evacuation plan under Sec. 75.1101-23.

30 CFR §75.1909

Non-permissible diesel-powered equipment; design and performance requirements.

(a) Non-permissible diesel-powered equipment, except for the special category of equipment under Sec. 75.1908(d), must be equipped with the following features:

(1) An engine approved under subpart E of part 7 of this title equipped with an air filter sized in accordance with the engine manufacturer's recommendations, and an air filter service indicator set in accordance with the engine manufacturer's recommendations;

(2) At least one portable multipurpose dry chemical type (ABC) fire extinguisher listed or approved by a nationally recognized independent testing laboratory with a 10A:60B:C or higher rating. The fire extinguisher must be located within easy reach of the equipment operator and protected from damage;

(3) A fuel system specifically designed for diesel fuel meeting the following requirements:

(i) A fuel tank and fuel lines that do not leak;

(ii) A fuel tank that is substantially constructed and protected against damage by collision;

(iii) A vent opening that maintains atmospheric pressure in the fuel tank, and that is designed to prevent fuel from splashing out of the vent opening;

(iv) A self-closing filler cap on the fuel tank;

(v) The fuel tank, filler and vent must be located so that leaks or spillage during refueling will not contact hot surfaces;

(vi) Fuel line piping must be either steel-wire reinforced; synthetic elastomer-covered hose suitable for use with diesel fuel that has been tested and has been determined to be fire-resistant by the manufacturer; or metal;

(vii) Fuel line piping must be clamped;

(viii) Primary fuel lines must be located so that fuel line leaks do not contact hot surfaces;

(ix) The fuel lines must be separated from electrical wiring and protected from damage in ordinary use;

(x) A manual shutoff valve must be installed in the fuel system as close as practicable to the tank; and

(xi) A water separator and fuel filter(s) must be provided.

(4) A sensor to monitor the temperature and provide a visual warning of an overheated cylinder head on air-cooled engines;

(5) Guarding to protect fuel, hydraulic, and electric lines when such lines pass near rotating parts or in the event of shaft failure;

(6) Hydraulic tanks, fillers, vents, and lines located to prevent spillage or leaks from contacting hot surfaces;

(7) Reflectors or warning lights mounted on the equipment which can be readily seen in all directions;

(8) A means to direct exhaust gas away from the equipment operator, persons on board the machine, and combustible machine components;

(9) A means to prevent unintentional free and uncontrolled descent of personnel- elevating work platforms; and

(10) A means to prevent the spray from ruptured hydraulic or lubricating oil lines from being ignited by contact with engine exhaust system component surfaces.

(b) Self-propelled non-permissible diesel-powered equipment must have the following features in addition to those in paragraph (a):

(1) A means to ensure that no stored hydraulic energy that will cause machine articulation is available after the engine is shut down;

(2) A neutral start feature which ensures that engine cranking torque will not be transmitted through the powertrain and cause machine movement on vehicles utilizing fluid power transmissions;

(3) For machines with steering wheels, brake pedals, and accelerator pedals, controls which are of automobile orientation;

(4) An audible warning device conveniently located near the equipment operator;

(5) Lights provided and maintained on both ends of the equipment. Equipment normally operated in both directions must be equipped with headlights for both directions;

(6) Service brakes that act on each wheel of the vehicle and that are designed such that failure of any single component, except the brake actuation pedal or other similar actuation device, must not result in a complete loss of service braking capability;

(7) Service brakes that safely bring the fully loaded vehicle to a complete stop on the maximum grade on which it is operated; and

(8) No device that traps a column of fluid to hold the brake in the applied position shall be installed in any brake system, unless the trapped column of fluid is released when the equipment operator is no longer in contact with the brake activation device.

(c) Self-propelled non-permissible heavy-duty diesel-powered equipment under Sec. 75.1908(a), except rail-mounted equipment, shall be provided with a supplemental braking system that:

(1) Engages automatically within 5 seconds of the shutdown of the engine;

(2) Safely brings the equipment when fully loaded to a complete stop on the maximum grade on which it is operated;

(3) Holds the equipment stationary, despite any contraction of brake parts, exhaustion of any nonmechanical source of energy, or leakage;

(4) Releases only by a manual control that does not operate any other equipment function;

(5) Has a means in the equipment operator's compartment to apply the brakes manually without shutting down the engine, and a means to release and reengage the brakes without the engine operating; and

(6) Has a means to ensure that the supplemental braking system is released before the equipment can be trammed, and is designed to ensure the brake is fully released

at all times while the equipment is trammed.

(d) Self-propelled non-permissible light-duty diesel-powered equipment under Sec. 75.1908(b), except rail-mounted equipment, must be provided with a parking brake that holds the fully loaded equipment stationary on the maximum grade on which it is operated despite any contraction of the brake parts, exhaustion of any nonmechanical source of energy, or leakage.

(e) The supplemental and park brake systems required by paragraphs (c) and (d) must be applied when the equipment operator is not at the controls of the equipment, except during movement of disabled equipment.

(f) Self-propelled personnel-elevating work platforms must be provided with a means to ensure that the parking braking system is released before the equipment can be trammed, and must be designed to ensure the brake is fully released at all times while the equipment is trammed.

(g) Any non-permissible equipment that discharges its exhaust directly into a return air course must be provided with a power package approved under subpart F of part 7 of this title.

(h) Self-propelled non-permissible heavy-duty diesel-powered equipment meeting the requirements of Sec. 75.1908(a) must be provided with an automatic fire suppression system meeting the requirements of Sec. 75.1911.

(i) Self-propelled non-permissible light-duty diesel-powered equipment meeting the requirements of Sec. 75.1908(b) must be provided with an automatic or manual fire suppression system meeting the requirements of Sec. 75.1911.

(j) Non-permissible equipment that is not self-propelled must have the following features in addition to those listed in paragraph (a):

(1) A means to prevent inadvertent movement of the equipment when parked;

(2) Safety chains or other suitable secondary connections on equipment that is being towed; and

(3) An automatic fire suppression system meeting the requirements of Sec. 75.1911.

30 CFR §75.1910

Non-permissible diesel-powered equipment; electrical system design and performance requirements.

Electrical circuits and components associated with or connected to electrical systems on non-permissible diesel-powered equipment utilizing storage batteries and integral charging systems, except for the special category of equipment under Sec. 75.1908(d), must conform to the following requirements:

(a) Overload and short circuit protection must be provided for electric circuits and components in accordance with Secs. 75.518 and 75.518-1 of this part;

(b) Each electric conductor from the battery to the starting motor must be protected against short circuit by fuses or other circuit- interrupting devices placed as near as practicable to the battery terminals;

(c) Each branch circuit conductor connected to the main circuit between the battery and charging generator must be protected against short circuit by fuses or other automatic circuit-interrupting devices;

(d) The electrical system shall be equipped with a circuit- interrupting device by means of which all power conductors can be de-energized. The device must be located as close as practicable to the battery terminals and be designed to operate within its electrical rating without damage. The device shall not automatically reset after being actuated. All magnetic circuit-interrupting devices must be mounted in a manner to preclude their closing by force of gravity;

(e) Each motor and charging generator must be protected by an automatic overcurrent device. One protective device will be acceptable when two motors of the same rating operate simultaneously and perform virtually the same duty;

(f) Each ungrounded conductor must have insulation compatible with the impressed voltage. Insulation materials must be resistant to deterioration from engine heat and oil. Electric conductors must meet the applicable requirements of Secs. 75.513 and 75.513-1, except electric conductors for starting motors, which must only meet the requirements of Sec. 75.513;

(g) All wiring must have adequate mechanical protection to prevent damage to the cable that might result in short circuits;

(h) Sharp edges and corners must be removed at all points where there is a possibility of damaging wires, cables, or conduits by cutting or abrasion. The insulation of the cables within a battery box must be protected against abrasion;

(i) When insulated wires other than cables pass through metal frames, the holes must be substantially bushed with insulated bushings. Cables must enter metal frames of motors, splice boxes, and electric components only through proper fittings. All electrical connections and splices must be mechanically and electrically efficient, and suitable connectors shall be used. All electrical connectors or splices in insulated wire must be reinsulated at least to the same degree of protection as the remainder of the wire;

(j) The battery must be secured to prevent movement, and must be protected from external damage by position. Batteries that are not protected from external damage by position must be enclosed in a battery box. Flame-resistant insulation treated to resist chemical reaction to electrolyte must be provided on battery connections to prevent battery terminals from contacting conducting surfaces;

(k) A battery box, including the cover, must be constructed of steel with a minimum thickness of $^{1/8}$ inch, or of a material other than steel that provides equivalent strength;

(l) Battery-box covers must be lined with a flame-resistant insulating material permanently attached to the underside of the cover, unless equivalent protection is provided. Battery-box covers must be provided with a means for securing them in closed position. At least $^{1/2}$ inch of air space must be provided between the underside of the cover and the top of the battery, including terminals;

(m) Battery boxes must be provided with ventilation openings to prevent the accumulation of flammable or toxic gases or vapors within the battery box. The size and locations of openings for ventilation must prevent direct access to battery terminals;

(n) The battery must be insulated from the battery-box walls and supported on insulating materials. Insulating materials that may be subject to chemical reaction with electrolyte must be treated to resist such action; and

(o) Drainage holes must be provided in the bottom of each battery box.

30 CFR §75.1911

Fire suppression systems for diesel-powered equipment and fuel transportation units.

(a) The fire suppression system required by Secs. 75.1907 and 75.1909 shall be a multipurpose dry chemical type (ABC) fire suppression system listed or approved by a nationally recognized independent testing laboratory and appropriate for installation on diesel-powered equipment and fuel transportation units.

(1) The system shall be installed in accordance with the manufacturer's specifications and the limitations of the listing or approval.

(2) The system shall be installed in a protected location or guarded to minimize physical damage from routine vehicle operations.

(3) Suppressant agent distribution tubing or piping shall be secured and protected against damage, including pinching, crimping, stretching, abrasion, and corrosion.

(4) Discharge nozzles shall be positioned and aimed for maximum fire suppression effectiveness. Nozzles shall also be protected against the entrance of foreign materials such as mud, coal dust, or rock dust.

(b) The fire suppression system shall provide fire suppression and, if automatic, fire detection for the engine including the starter, transmission, hydraulic pumps and tanks, fuel tanks, exposed brake units, air compressors and battery areas on diesel-powered equipment and electric panels or controls used on fuel transportation units and other areas as necessary.

(c) If automatic, the fire suppression system shall include audible and visual alarms to warn of fires or system faults.

(d) The fire suppression system shall provide for automatic engine shutdown. If the fire suppression system is automatic, engine shutdown and discharge of suppressant agent may be delayed for a maximum of 15 seconds after the fire is detected by the system.

(e) The fire suppression system shall be operable by at least two manual actuators. One actuator shall be located on each side of the equipment. If the equipment is provided with an operator's compartment, one of the manual actuators shall be located in the compartment within reach of the operator.

(f) The fire suppression system shall remain operative in the event of engine shutdown, equipment electrical system failure, or failure of any other equipment system.

(g) The electrical components of each fire suppression system installed on equipment used where permissible electric equipment is required shall be permissible or intrinsically safe and such components shall be maintained in permissible or intrinsically safe condition.
(h) Electrically operated detection and actuation circuits shall be monitored and provided with status indicators showing power and circuit continuity. If the system is not electrically operated, a means shall be provided to indicate the functional readiness status of the detection system.

(i) Each fire suppression system shall be tested and maintained in accordance with the manufacturer's recommended inspection and maintenance program and as required by the nationally recognized independent testing laboratory listing or approval, and be visually inspected at least once each week by a person trained to make such inspections.

(j) Recordkeeping Persons performing inspections and tests of fire suppression systems under paragraph (i) shall record when a fire suppression system does not meet the installation or maintenance requirements of this section.

(1) The record shall include the equipment on which the fire suppression system did not meet the installation or maintenance requirements of this section, the defect found, and the corrective action taken.

(2) Records are to be kept manually in a secure manner not susceptible to alteration or recorded electronically in a secured computer system that is not susceptible to alteration.

(3) Records shall be maintained at a surface location at the mine for one year and made available for inspection by an authorized representative of the Secretary and miners' representatives.

(k) All miners normally assigned to the active workings of the mine shall be instructed about the hazards inherent to the operation of the fire suppression systems and, where

appropriate, the safeguards available for each system.

(l) For purposes of Sec. 75.380(f), a fire suppression system installed on diesel-powered equipment and meeting the requirements of this section is equivalent to a fire suppression system meeting the requirements of Secs. 75.1107-3 through 75.1107-16.

30 CFR §75.1912

Fire suppression systems for permanent underground diesel fuel storage facilities.

(a) The fire suppression system required by Sec. 75.1903 shall be an automatic multipurpose dry chemical type (ABC) fire suppression system listed or approved as an engineered dry chemical extinguishing system by a nationally recognized independent testing laboratory and appropriate for installation at a permanent underground diesel fuel storage facility.

(1) Alternate types of fire suppression systems shall be approved in accordance with Sec. 75.1107-13 of this part.

(2) The system shall be installed in accordance with the manufacturer's specifications and the limitations of the listing or approval.

(3) The system shall be installed in a protected location or guarded to prevent physical damage from routine operations.

(4) Suppressant agent distribution tubing or piping shall be secured and protected against damage, including pinching, crimping, stretching, abrasion, and corrosion.

(5) Discharge nozzles shall be positioned and aimed for maximum fire suppression effectiveness in the protected areas. Nozzles must also be protected against the entrance of foreign materials such as mud, coal dust, and rock dust.

(b) The fire suppression system shall provide automatic fire detection and automatic fire suppression for all areas within the facility.

(c) Audible and visual alarms to warn of fire or system faults shall be provided at the protected area and at a surface location which is continually monitored by a person when personnel are underground. In the event of a fire, personnel shall be warned in accordance with the provisions set forth in Sec. 75.1101-23.

(d) The fire suppression system shall de-energize all power to the diesel fuel storage facility when actuated except that required for automatic enclosure and alarms.

(e) Fire suppression systems shall include two manual actuators located as follows:

(1) At least one within the fuel storage facility; and

(2) At least one a safe distance away from the storage facility and located in intake air, upwind of the storage facility.

(f) The fire suppression system shall remain operational in the event of electrical system failure.

(g) Electrically operated detection and actuation circuits shall be monitored and provided with status indicators showing power and circuit continuity. If the system is not electrically operated, a means shall be provided to indicate the functional readiness status of the detection system.

(h) Each fire suppression system shall be tested and maintained in accordance with the manufacturer's recommended inspection and maintenance program and as required by the nationally recognized independent testing laboratory listing or approval, and be visually inspected at least once each week by a person trained to make such inspections.

(i) *Recordkeeping.* Persons performing inspections and tests of fire suppression systems under paragraph (h) shall record when a fire suppression system does not meet the installation or maintenance requirements of this section.

(1) The record shall include the facility whose fire suppression system did not meet the installation or maintenance requirements of this section, the defect found, and the corrective action taken.

(2) Records are to be kept manually in a secure manner not susceptible to alteration or recorded electronically in a secured computer system that is not susceptible to alteration.

(3) Records shall be maintained at a surface location at the mine for one year and made available for inspection by an authorized representative of the Secretary and miners' representatives.

(j) All miners normally assigned to the active workings of the mine shall be instructed about the hazards inherent to the operation of the fire suppression systems and, where appropriate, the safeguards available for each system.

[61 FR 55527, Oct. 25, 1996; 70 FR 36347, June 23, 2005]

30 CFR §75.1913

Starting aids.

(a) Volatile fuel starting aids shall be used in accordance with recommendations provided by the starting aid manufacturer, the engine manufacturer, and the machine manufacturer.

(b) Containers of volatile fuel starting aids shall be conspicuously marked to indicate the contents. When not in use, containers of volatile fuel starting aids shall be stored in metal enclosures that are used only for storage of starting aids. Such metal enclosures must be conspicuously marked, secured, and protected from damage.

(c) Volatile fuel starting aids shall not be:

(1) Taken into or used in areas where permissible equipment is required;

(2) Used in the presence of open flames or burning flame safety lamps, or when welding or cutting is taking place; or

(3) Used in any area where 1.0 percent or greater concentration of methane is present.

(d) Compressed oxygen or compressed flammable gases shall not be connected to diesel air-start systems.

30 CFR §75.1914

Maintenance of diesel-powered equipment.

(a) Diesel-powered equipment shall be maintained in approved and safe condition or removed from service.

(b) Maintenance and repairs of approved features and those features required by Secs. 75.1909 and 75.1910 on diesel-powered equipment shall be made only by a person qualified under Sec. 75.1915.

(c) The water scrubber system on diesel-powered equipment shall be drained and flushed, by a person who is trained to perform this task, at least once on each shift in which the equipment is operated. (d) The intake air filter on diesel-powered equipment shall be replaced or serviced, by a person who is trained to perform this task, when the intake air pressure drop device so indicates or when the engine manufacturer's maximum allowable air pressure drop level is exceeded.

(d) The intake air filter on diesel-powered equipment shall be replaced or serviced, by a person who is trained to perform this task, when the intake air pressure drop device so indicates or when the engine manufacturer's maximum allowable air pressure drop level is exceeded.

(e) Mobile diesel-powered equipment that is to be used during a shift shall be visually examined by the equipment operator before being placed in operation. Equipment defects affecting safety shall be reported promptly to the mine operator.

(f) All diesel-powered equipment shall be examined and tested weekly by a person qualified under Sec. 75.1915.

(1) Examinations and tests shall be conducted in accordance with approved checklists and manufacturers' maintenance manuals.

(2) Persons performing weekly examinations and tests of diesel- powered equipment under this paragraph shall make a record when the equipment is not in approved or

safe condition. The record shall include the equipment that is not in approved or safe condition, the defect found, and the corrective action taken.

(g) Undiluted exhaust emissions of diesel engines in diesel-powered equipment approved under part 36 and heavy-duty non-permissible diesel- powered equipment as defined in Sec. 75.1908(a) in use in underground coal mines shall be tested and evaluated weekly by a person who is trained to perform this task. The mine operator shall develop and implement written standard operating procedures for such testing and evaluation that specify the following:

(1) The method of achieving a repeatable loaded engine operating condition for each type of equipment;

(2) Sampling and analytical methods (including calibration of instrumentation) that are capable of accurately detecting carbon monoxide in the expected concentrations;

(3) The method of evaluation and interpretation of the results;

(4) The concentration or changes in concentration of carbon monoxide that will indicate a change in engine performance. Carbon monoxide concentration shall not exceed 2500 parts per million; and

(5) The maintenance of records necessary to track engine performance.

(h) *Recordkeeping.* Records required by paragraphs (f)(2) and (g)(5) shall be--

(1) Recorded in a secure book that is not susceptible to alteration, or recorded electronically in a computer system that is secure and not susceptible to alteration; and

(2) Retained at a surface location at the mine for at least 1 year and made available for inspection by an authorized representative of the Secretary and by miners' representatives.

(i) Diesel-powered equipment must be maintained in accordance with this part as of November 25, 1997.

30 CFR §75.1915

Training and qualification of persons working on diesel- powered equipment.

(a) To be qualified to perform maintenance, repairs, examinations and tests on diesel-powered equipment, as required by Sec. 75.1914, a person must successfully complete a training and qualification program that meets the requirements of this section. A person qualified to perform these tasks shall be retrained as necessary to maintain the ability to perform all assigned diesel-powered equipment maintenance, repairs, examinations and tests.

(b) A training and qualification program under this section must:

(1) Be presented by a competent instructor;

(2) Be sufficient to prepare or update a person's ability to perform all assigned tasks with respect to diesel-powered equipment maintenance, repairs, examinations and tests;

(3) Address, at a minimum, the following:

(i) The requirements of subpart T of this part;

(ii) Use of appropriate power package or machine checklists to conduct tests to ensure that diesel-powered equipment is in approved and safe condition, with acceptable emission levels;

(iii) Proper maintenance of approved features and the correct use of the appropriate maintenance manuals, including machine adjustments, service, and assembly;

(iv) Diesel-powered equipment fire suppression system tests and maintenance;

(v) Fire and ignition sources and their control or elimination, including cleaning of the equipment;

(vi) Safe fueling procedures and maintenance of the fuel system of the equipment; and

(vii) Intake air system maintenance and tests.

(4) Include an examination that requires demonstration of the ability to perform all assigned tasks with respect to diesel-powered equipment maintenance, repairs, examinations and tests; and

(5) *Be in writing.* The written program shall include a description of the course content, materials, and teaching methods for initial training and retraining.

(c) *Recordkeeping.* The operator shall maintain a copy of the training and qualification program required by this section and a record of the names of all persons qualified under the program.

(1) The record of the names of qualified persons shall be made in a manner that is not susceptible to alteration, or recorded electronically in a computer system that is secure and not susceptible to alteration.

(2) The training and qualification program and record of qualified persons are to be kept at surface location of the mine and made available for inspection by an authorized representative of the Secretary and by miners' representatives.

30 CFR §75.1916

Operation of diesel-powered equipment.

(a) Diesel-powered equipment shall be operated at a speed that is consistent with the type of equipment being operated, roadway conditions, grades, clearances, visibility, and other traffic.

(b) Operators of mobile diesel-powered equipment shall maintain full control of the equipment while it is in motion.

(c) Standardized traffic rules, including speed limits, signals and warning signs, shall be established at each mine and followed.

(d) Except as required in normal mining operations, mobile diesel- powered equipment shall not be idled.

(e) Diesel-powered equipment shall not be operated unattended.