

STATEMENTS OF FACT MINE RESCUE

1. Three elements must be present for an explosion to occur: fuel, oxygen, and heat (ignition).
2. Permanent seals should be well hitched in the roof, floor, and ribs to make them as airtight as possible.
3. Electrical fires are best extinguished by nonconducting agents such as carbon dioxide and certain dry chemicals.
4. Under no circumstances should ventilation be altered without orders to do so from the command center.
5. "Class A" fires are best extinguished by cooling with water or by blanketing with certain dry chemicals.
6. The first priority of rescue and recovery operations is team safety.
7. The second priority of rescue and recovery operations is the rescue of survivors.
8. The third priority of rescue and recovery operations is the recovery of the mine.
9. A fresh-air base is established at the point where conditions no longer permit barefaced exploration.
10. Hydrogen can be liberated when water or steam comes in contact with hot carbon materials.
11. All conductive objects such as cables, track, trolley wire, water lines, belt structures, etc., extending into the explosion area should be severed or removed at or outby the fresh-air base before explorations are started.
12. Explosions in coal mines are most often caused by ignitions of methane, coal dust, or a combination of the two.
13. An indication of an explosion may be a jump in the pressure recording chart for the main fan.
14. Gas readings must be taken in the returns near the fire area to determine if the mine atmosphere is potentially explosive.
15. Seals in high volatile coalbeds are often placed 1,000 feet or more from the fire area.
16. When sealing a mine fire, you should be careful to ensure that there are no abrupt changes in the ventilation over the fire area.

17. Non-metallic sampling- pipes are inserted in temporary and permanent seals for the purpose of collecting air samples from the sealed area.
18. Before going underground to explore for a fire or to fight a fire, the team should know about any possible ignition sources that may exist in the affected area.
19. The team should make sure the main fan is running, a guard is monitoring the operation of the fan, and that tests are being made at the main return for any gases that may be present in the mine, before they go underground.
20. Before a fresh-air base is advanced, gas tests should be made in all dead ends and high places between the old and new fresh-air base.
21. Your captain may order the team to return immediately to the fresh-air base if a team member's apparatus malfunctions.
22. In potentially explosive atmospheres, nonsparking tools, nails, and spads should be used.
23. When you have located a barricade, you should try to determine whether the miners inside are still alive and conscious.
24. Carbon monoxide is a product of incomplete combustion of any carbon material.
25. Opening of seals prematurely can cause a re-ignition of a fire or an explosion.
26. Specific gravity is the weight of a gas compared to an equal volume of normal air under the same temperature and pressure.
27. The explosive range of methane in air is 5 to 15 volume percent.
28. The lower explosive limit of hydrogen is 4.0 percent.
29. Acetylene is formed when methane is burned or heated in air having a low oxygen content.
30. Continual exposure to hydrogen sulfide may dull the sense of smell.
31. The specific gravity of methane is 0.5545.
32. The specific gravity of carbon dioxide is 1.5291.
33. The specific gravity of carbon monoxide is 0.9672.
34. Blackdamp is a mixture of carbon dioxide, nitrogen and air which is oxygen deficient.
35. Smoke usually contains carbon monoxide and other toxic or asphyxiating gases produced by fires.

36. Breathing air containing 10 percent carbon dioxide causes violent panting and can lead to death.
37. The first symptom of carbon monoxide poisoning is a slight tightening across the forehead and possibly a headache.
38. High temperatures (or heat) cause gases to expand so they diffuse more quickly.
39. It is much easier to remove a concentration of a light gas like methane by ventilation than it is to remove the same concentration of a heavier gas like carbon dioxide.
40. Small hydrogen explosions, known as hydrogen "pops" are fairly common in firefighting.
41. Explosions, fires, and other disasters frequently result in weakened roof and rib conditions.
42. Before a rescue team goes underground, it will attend a briefing session.
43. The range of each gas sensor should be determined prior to taking a gas detector underground for mine rescue use.
44. Regulators are used in mine ventilation to regulate airflow to meet the individual needs of each air split.
45. Overcasts are used to permit two air currents to cross without the intake air short circuiting to the return.
46. When reporting anything to the fresh-air base, be sure you are clearly and correctly identifying locations.
47. The lower explosive limit of carbon monoxide is 12.5 percent.
48. The basic principle of mine ventilation is that air always moves from high to low pressure regions.
49. The most positive indicator of the origin of an explosion is the direction in which blocks have moved in or from stoppings across entries near intersections.
50. Coking or coke streamers, if encountered, should be reported in location and size.
51. Sulfur dioxide and hydrogen sulfide are water soluble gases.
52. Color, odor, and taste are physical properties that help to identify gases during barefaced exploration.
53. Only detectors and chemical analysis can positively identify a gas.

54. The effects of toxic gases depend on the concentration, toxicity, and exposure time.
55. Asphyxiates are gases which cause suffocation or choking.
56. Firedamp is a mixture of methane in air that will burn or explode when ignited.
57. If there is a sufficient amount of hydrocarbons in smoke, the smoke may be explosive.
58. Ventilation controls are used underground to properly distribute air to all sections of the mine.
59. Gases with specific gravities less than 1.0 tend to seek high places.
60. Gases with specific gravities greater than 1.0 tend to seek low places.
61. In order to maintain an airlock, one door of the airlock must be kept closed while the other is opened.
62. Rescue teams should build an airlock so that the two stoppings are erected as close together as possible yet with enough space to allow room for the team and their equipment to fit in between.
63. If the fresh air base is underground, it should be located where it's assured a fresh air travelway to the surface.
64. The fresh air base should be located where it's assured positive ventilation and fresh air.
65. Elevators should be tested before use following a disaster.
66. As a team advances, it is important to stay in close contact with the fresh air base/command center.
67. Methane is lighter than air.
68. Normal air has a specific gravity of one.
69. Sufficient time should be allowed for a fire area to cool before it is unsealed.
70. Team captains should inspect roof and ribs before the team members advance into the area.
71. The roof and ribs should be tested before extinguishing a fire.
72. Hazardous areas should be marked to warn other teams that may enter the area after yours.

73. Progress reports should include reports on roof and rib conditions and gas conditions.
74. The time spent under oxygen by a rescue team is usually limited to two hours or less.
75. When looking for survivors, it is important to both look and listen for clues.
76. For a Class C fire (electrical), if power has been cut off to the burning equipment, it may be treated as a Class A or B fire.
77. When survivors are located, their location, identities, and condition should be reported immediately to the command center.
78. When survivors are located, the location, time, and date should be marked on the team's map and on the rib where they are found.
79. When survivors are located, they should be transported to safety and fresh air as quickly as possible.
80. The main objective of recovery work is to put the affected area of the mine back in operation as soon as possible.
81. All temporary seals should be well hitched in the floor roof, and ribs to improve their strength.
82. Urethane foam is an effective sealant when used around the perimeter of a seal.
83. High volatile coal burns much faster than low or medium volatile coal.
84. It may be necessary to double or triple the thickness of the material in order to improve the effectiveness of a temporary seal.
85. Seals should be built at locations with good roof and even roof and ribs.
86. Rescue Teams may encounter many hazards while fighting fires directly by hand.
87. When fires are sealed in gassy or dusty mines, a thick coating of rock dust should be applied to the ribs, roof and floor for several hundred feet outby the seals.
88. The main objectives of exploration work during a mine fire are locating the fire and assessing conditions in the fire area.
89. A self-contained breathing apparatus is a completely portable unit that supplies oxygen or air independently of the surrounding atmosphere.

90. A smoke tube is used to show the direction and velocity of slow-moving air.
91. If a team member must return to the fresh air base because of a problem, it is standard practice among teams for the entire team to go back with that person.
92. Thermal imaging cameras should only be used in less than 1 percent of Methane.
93. Once rescued, survivors should never be left alone.
94. ~~The lower explosive limit of hydrogen is 4.0 percent~~ The IDLH for Carbon Monoxide is 1200 ppm.
95. The IDLH of Nitrogen Dioxide is 20 ppm.
96. Clean, dry air at sea level is made up of 78 percent nitrogen and 21 percent oxygen.
97. After a fire has been sealed, it is recommended to wait 72 hours before making the initial visit to the seals.
98. When appropriate, a fire area is not un-sealed until the oxygen content is low enough to make explosions impossible and the carbon monoxide has disappeared.
99. Firefighters force inert gases into areas where they are trying to remove the oxygen leg of the fire triangle.
100. A team is a unit made up of individuals working toward a common goal.