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) Explosions in coal mines are most often caused by ignitions of methane, coal dust, or a combination of the two.

12) An indication of an explosion may be a jump in the pressure recording chart for the main fan.

13) Gas readings must be taken in the returns near the fire area to determine if the mine atmosphere is potentially explosive.

14) Seals in high volatile coalbeds are often placed 1,000 feet or more from the fire area.

15) When sealing a mine fire, you should be careful to ensure that there are no abrupt changes in the ventilation over the fire area.

16) Non-metallic sampling- pipes are inserted in temporary and permanent seals for the purpose of collecting air samples from the sealed area.

17) 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.

18) 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.

19) Your captain may order the team to return immediately to the fresh-air base if a team member's apparatus malfunctions.

20) In potentially explosive atmospheres, nonsparking tools, nails, and spads should be used.

21) When you have located a barricade, you should try to determine whether the miners inside are still alive and conscious.

22) Carbon monoxide is a product of incomplete combustion of any carbon material.

23) Opening of seals prematurely can cause a re-ignition of a fire or an explosion.

24) Specific gravity is the weight of a gas compared to an equal volume of normal air under the same temperature and pressure.

25) The explosive range of methane in air is 5 to 15 volume percent.

26) The lower explosive limit of hydrogen is 4.0 percent.

27) Acetylene is formed when methane is burned or heated in air having a low oxygen content.

28) Continual exposure to hydrogen sulfide may dull the sense of smell.

29) The specific gravity of methane is 0.5545.

30) The specific gravity of carbon dioxide is 1.5291.

31) The specific gravity of carbon monoxide is 0.9672.

32) Blackdamp is a mixture of carbon dioxide, nitrogen and air which is oxygen deficient.

33) Smoke usually contains carbon monoxide and other toxic or asphyxiating gases produced by fires.

34) Breathing air containing 10 percent carbon dioxide causes violent panting and can lead to death.

35) The first symptom of carbon monoxide poisoning is a slight tightening across the forehead and possibly a headache.

36) High temperatures (or heat) cause gases to expand so they diffuse more quickly.

37) Small hydrogen explosions, known as hydrogen "pops" are fairly common in firefighting.

38) Explosions, fires, and other disasters frequently result in weakened roof and rib conditions.

39) Before a rescue team goes underground, it will attend a briefing session.

40) The range of each gas sensor should be determined prior to taking a gas detector underground for mine rescue use.

41) Regulators are used in mine ventilation to regulate airflow to meet the individual needs of each air split.

42) Overcasts are used to permit two air currents to cross without the intake air short circuiting to the return.

43) When reporting anything to the fresh-air base, be sure you are clearly and correctly identifying locations.

44) The lower explosive limit of carbon monoxide is 12.5 percent.

45) The basic principle of mine ventilation is that air always moves from high to low pressure regions.

46) Coking or coke streamers, if encountered, should be reported in location and size.

47) Rock dust is most successfully used to fight a fire by applying it by hand or by shoveling it onto the fire.

48) A member of a rescue team must be examined by a physician at least annually.

49) The purposes of sealing a mine fire are to contain the fire to a specific area and to exclude oxygen from the fire and eventually smother it.

50) Electrical fires are “Class C” fires.

51) One signal (pull) or “Stop” means that the rescue team wants to stop.

52) Two signals (pulls) or “Advance” means that the rescue team is going to to advance, move toward the captain.

53) Three signals (pulls) or "Retreat" means that the rescue team is going to retreat, move toward the No. 5 person (last Person).

54) Four signals (pulls) or "Distress or Emergency" means that the rescue team is in distress or emergency.

55) Team members should refrain from drinking alcoholic beverages for at least 12 to 18 hours before they get under oxygen.

56) Barefaced exploration should stop at any point where disruptions in ventilation are found.

57) During exploration, teams will work according to a rotation schedule.

58) Smoke consists of tiny particles of solid and liquid matter suspended in the air.

59) The fresh air base should be situated where it can be linked to the command center by means of a communication system.

60) Communications must be maintained between the fresh air base and command center at all times.

61) Toxic gases are produced by burning rubber, neoprene, or polyvinyl chloride (PVC).

62) The recommended extinguisher for mine rescue teams is a dry chemical type that contains monoammonium phosphate.

63) A monoammonium phosphate extinguisher is effective in fighting Class A, B, and C fires.

64) Foam is useful only in fighting Class A and B fires.

65) Exploration is the term used to describe the process of assessing conditions underground and locating miners or clues to their whereabouts.

66) Whenever possible, it is best to enter the mine by way of the safest intake airway.

67) Barefaced exploration should be attempted only when a back-up mine rescue team with apparatus is immediately available.

68) The fresh air base is the base of operations from which the rescue and recovery teams can advance into irrespirable atmospheres.

69) When rescue teams travel in smoke, all team members should hold onto the lifeline or be linked together by means of a linkline.

70) Team members cannot travel into or through water over waist deep (water cannot contact apparatus).

71) Air courses separated by stoppings must be examined on both sides (tied in) where accessible to assure the safety of the team.

72) Before opening and traveling through any stopping inby which conditions are not definitely known, you should first erect a temporary stopping outby.

73) A debriefing is a session held when a team returns to the surface after completing an assignment to review what they saw and did.

74) The TLV-TWA for Carbon Monoxide is 50 ppm.

75) The STEL is a 15 minute TWA exposure which should not be exceeded at any time during a work day for a gas.

76) The STEL for Carbon Monoxide is 200 ppm.

77) The IDLH for Carbon Monoxide is 1200 ppm.

78) Heat rises and because it is stopped by the mine roof it generates forces.

79) Every force creates an equal and opposite force (this leads to smoke and fire rollback and methane layers).

80) The Universal Gas Law, pressure and volume are directly related to temperature, means the hotter the fire the higher the pressures it develops.

81) Stopping smoke rollback is a must because if you cannot control the rollback, you probably can't get close enough to fight the fire effectively.

82) Gas layering is like smoke rollback with Methane and Hydrogen the likely gases to form layers during a fire.

83) The IDLH of Carbon Dioxide is 40,000 ppm.

84) The purpose of an airlock is to separate two different atmospheres while still permitting miners to enter and exit without mixing the atmospheres.

85) Temporary seals should include provisions for collecting air samples from within the sealed area.

86) Progressive ventilation is the reventilation of a sealed area in successive blocks by means of airlocks.

87) Direct ventilation is the reventilation of an entire sealed area at once.

88) Carbon dioxide has no color.

89) Hydrogen sulfide is highly toxic.

90) Nitrogen dioxide has a reddish-brown color in high concentrations.

91) Sulfur dioxide is nonexplosive.

92) Nitrogen is nonexplosive.

93) Oxygen has no odor.

94) Hydrogen sulfide has an odor similar to rotten eggs.

95) Carbon monoxide has no color.

96) Nitrogen dioxide is nonexplosive.

97) Nitrogen has no taste.

98) Carbon dioxide is nonexplosive.

99) Carbon monoxide has no taste.

100) Sulfur dioxide is highly toxic.

101) Nitrogen is an asphyxiant in above normal concentrations.

102) The IDHL of Hydrogen sulfide and Sulfur Dioxide is 100 ppm.

103) The affinity of carbon monoxide for hemoglobin is 200 to 300 times that of oxygen.

104) Carbon Dioxide is the product of oxidation including the decay of timbers.

105) Afterdamp is a mixture of carbon monoxide, carbon dioxide, methane, oxygen, nitrogen and hydrogen.

106) Afterdamp is usually found after a mine fire or explosion.

107) Hydrogen can be detected with a multi-gas detector or by chemical analysis.

108) In some mines, carbon dioxide is liberated from the rock strata.

109) To detect oxygen deficient atmospheres teams will use an oxygen indicator.

110) To test for methane, use a methane detector or chemical analysis.

111) Carbon monoxide can be detected by means of carbon monoxide detectors, multi-gas detectors, or by chemical analysis.

112) Nitrogen dioxide is produced by burning and by the detonation of explosives.

113) A mixture of coal dust in air reduces the explosive limit of methane.

114) One and one-half to two percent methane together with coal dust in air may be explosive.

115) Mines below the water table tend to have more methane than those above the water table.

116) After a fire or explosion in a mine, rescue teams are usually needed to go into the mine to assess and re-establish ventilation.

117) The range of concentrations within which a gas will explode are known as its "explosive range".

118) Any flammable gas can explode under certain conditions.

119) Indirect firefighting methods allow firefighters to remain a safe distance from the fire.

120) Temporary seals are built before permanent seals are erected in order to seal off a fire area as quickly as possible.

121) In mines where head coal (roof coal) is left, a fire will spread more rapidly.

122) One hazard of heat during a fire is that it tends to weaken the roof, especially where head coal is left.

123) Fires can be attacked by the use of a foam generator from a distance of 500-1,500 feet.

124) It is generally recommended that teams not travel through foam filled areas.

125) One method of indirect firefighting is flooding the sealed fire area with water.

126) Once an explosion has occurred, there is always the possibility of further explosions.

127) Mine rescue teams may find it necessary to use line brattice to sweep noxious or explosive gases from a face area.

128) Once ventilation has been re-established and fresh air advanced, non-apparatus crews can take over the rehabilitation and cleanup effort.

129) Rescue teams are responsible for assessing damage to the ventilation system.

130) Information the team relays to the fresh-air base as it proceeds is known as the "progress report".

131) It is the responsibility of rescue team members to have all the information needed to do the work.

132) When a team locates a body, its location and position should be marked on a mine map and on the roof or rib close to the body.

133) The rescue team captain should regulate the team's pace according to conditions encountered.

134) When a body is first located, every effort should be made not to disturb any possible evidence in the area.

135) In situations too hazardous for teams to explore and reventilate safely, teams may be instructed to seal the area.

136) New mine rescue team members must have at least 20 hours of instruction on the breathing apparatus used by the team.

137) It is recommended that team checks be conducted every 15 to 20 minutes.

138) It is recommended that the first stop for a team check be just inby the fresh-air base.

139) "Tying in" is the process by which you systematically explore all crosscuts and adjacent areas as you advance.

140) As the team advances underground, the captain takes the lead.

141) It is important that the team pace its work so that it can return to the fresh air base on time.

142) As the team advances, the map man records what the team encounters by marking the information on a mine map.

143) The team is responsible for choosing the exact sites within headings for building seals.

144) Smoke causes a lack of orientation which may cause a team member to lose his/her sense of balance.

145) Class B fires involve flammable or combustible liquids.

146) Class D fires involve combustible metals.

147) Before using a handheld extinguisher, it must be checked for the type of fire you are fighting.

148) Solubility is the ability of a gas to be dissolved in water.

149) Pools of water can release water soluble gases into the air when they are stirred up.

150) High expansion foam is light and resilient and can travel long distances to a fire without breaking down.

151) Low expansion foam is very wet and heavy and can only be used when you're close enough to a fire to force the foam directly onto the fire.

152) Carbon monoxide is explosive.

153) Oxygen is a supporter of combustion.

154) If smoke is so dense as to make visibility poor, you may need to keep in constant physical contact with an object or a rib in order to feel your way along.

155) Two types of fire cannot be fought directly, fuel rich and spon com (spontaneous combustion).

156) Team safety must not be compromised.

157) Sulfur dioxide and hydrogen sulfide are water soluble gases.

158) Color, odor, and taste are physical properties that help to identify gases duringbarefaced exploration.

159) Only detectors and chemical analysis can positively identify a gas.

160) The effects of toxic gases depend on the concentration, toxicity, and exposure time.

161) Asphyxiates are gases which cause suffocation or choking.

162) Firedamp is a mixture of methane in air that will burn or explode when ignited.

163) If there is a sufficient amount of hydrocarbons in smoke, the smoke may be explosive.

164) Ventilation controls are used underground to properly distribute air to allsections of the mine.

165) Gases with specific gravities less than 1.0 tend to seek high places.

166) Gases with specific gravities greater than 1.0 tend to seek low places.

167) In order to maintain an airlock, one door of the airlock must be kept closed while the other is opened.

168) If the fresh air base is underground, it should be located where it's assured a freshair travelway to the surface.

169) The fresh air base should be located where it's assured positive ventilation andfresh air.

170) Elevators should be tested before use following a disaster.

171) As a team advances, it is important to stay in close contact with the fresh air base/command center.

172) Methane is lighter than air.

173) Normal air has a specific gravity of one.

174) Sufficient time should be allowed for a fire area to cool before it is unsealed.

175) Team captains should inspect roof and ribs before the team members advanceinto the area.

176) The roof and ribs should be tested before extinguishing a fire.

177) Hazardous areas should be marked to warn other teams that may enter the areaafter yours.

178) Progress reports should include reports on roof and rib conditions and gasconditions.

179) The time spent under oxygen by a rescue team is usually limited to two hours or less.

180) When looking for survivors, it is important to both look and listen for clues.

181) 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.

182) When survivors are located, their location, identities, and condition should bereported immediately to the command center.

183) 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.

184) When survivors are located, they should be transported to safety and fresh air as quickly as possible.

185) The main objective of recovery work is to put the affected area of the mine back inoperation as soon as possible.

186) All temporary seals should be well hitched in the floor roof, and ribs to improve their strength.

187) Urethane foam is an effective sealant when used around the perimeter of a seal.

188) High volatile coal burns much faster than low or medium volatile coal.

189) It may be necessary to double or triple the thickness of the material in order toimprove the effectiveness of a temporary seal.

190) Seals should be built at locations with good roof and even roof and ribs.

191) Rescue Teams may encounter many hazards while fighting fires directly by hand.

192) The main objectives of exploration work during a mine fire are locating the fire and assessing conditions in the fire area.

193) A smoke tube is used to show the direction and velocity of slow moving air.

194) Thermal imaging cameras should only be used in less than 1 percent of Methane.

195) Once rescued, survivors should never be left alone.

196) The IDLH of Nitrogen Dioxide is 20 ppm.

197) Clean, dry air at sea level is made up of 78 percent nitrogen and 21 percent oxygen.

198) After a fire has been sealed, it is recommended to wait 72 hours before making the initial visit to the seals.

199) Firefighters force inert gases into areas where they are trying to remove the oxygen leg of the fire triangle.

200) A team is a unit made up of individuals working toward a common goal.