DECEMBER 1982

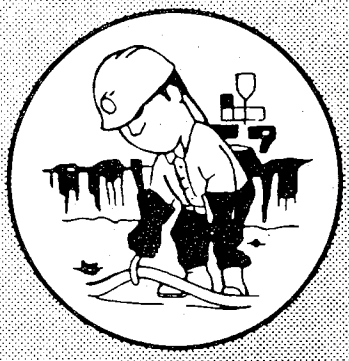
HOLMES SAFETY ASSOCIATION

E PLURIBUS UNUM

SAFETY EFFICIENCY

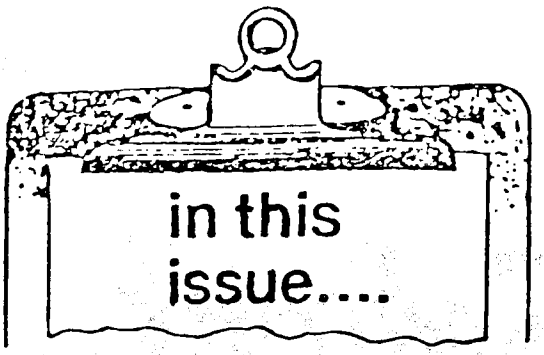
MINERAL INDUSTRIES

BULLETIN



FOLLOW SAFETY THRU in -82-

HOLMES SAFETY ASSOCIATION



December 1982

Season's Greetings

HOLMES SAFETY ASSOCIATION

AND MAY THE

New Year

KEEP YOU & FAMILY
SAFE AND SOUND

December 1982

HOLMES SAFETY ASSOCIATION MONTHLY SAFETY TOPIC

Grace Coal Corporation
Grace Coal
Haysi, Virginia

TJ and PE Coal Company Inc
TJ and PE
Hurley, Virginia

Sharon Coal Company
Sharon No. 1 Strip
Reedsville, West Virginia

Sharon Coal Company
Sharon No. 2 JR Strip
Reedsville, West Virginia

Duncan Coal Company
Duncan
Kopperston, West Virginia

Harrison Mine Company
Harrison Mine
Oceana, West Virginia

Pond Fork Company
Pond Fork No. 1
Oceana, West Virginia

Calloway Mining Company
Calloway Mining
Oceana, West Virginia

Elbow Mining Company
Elbow Mining
Princeton, West Virginia

True Energy Company
True Energy
Princeton, West Virginia

Permac Incorporated
Permac
Oakwood, Virginia

Race Fork Coal Company
Race Fork Coal
Hurley, Virginia

R and D Coal Company
R and D No. 29
Wolford, Virginia

Virginia Crews Coal Company
Alpine No. 1
Iaeger, West Virginia

Millburn Coal Company
Millburn Colliery No. 4
Burnwell, West Virginia

Imperial Coal Company
Imperial No. 14
Burnwell, West Virginia

Imperial Coal Company
Imperial No. 20
Burnwell, West Virginia

Millburn Coal Company
Millburn Prep Plant
Burnwell, West Virginia

Eskdale Coal Company
Eskdale Plant
Burnwell, West Virginia

Beckley Coal Mining Company
Beckley Coal
Glen Daniel, West Virginia

Slab Fork Coal Company
Slab Fork Coal
Slab Fork, West Virginia

Long Branch Energy Company
Long Branch
Danville, West Virginia

Maiden Mining Company Inc
Maiden Mining
Maidsville, West Virginia

Maidsville Coal Company Inc
Maidsville Coal
Maidsville, West Virginia

Consolidation Coal Company
Shawnee Strip
Horsepen, Virginia

Kleen Coal Company
Kleen Coal
Kingwood, West Virginia

Patriot Coal Company
Patriot Coal
Albright, West Virginia

Virginia Crews Coal Company
Virginia Crews
Iaeger, West Virginia

Black Maverick Coal Company
Black Maverick
Coaldale, West Virginia

Jewell Smokeless Coal Corp
Jewell Smokeless Safety Dept
Vansant, Virginia

Westmoreland Coal Company
Central Shop
Clothier, West Virginia

Westmoreland Coal Company
Ferrell No. 17
Madison, West Virginia

Westmoreland Coal Company
No. 3 Prep Plant
Clothier, West Virginia

Westmoreland Coal Company
Hampton No. 3
Clothier, West Virginia

New Elk Coal Company Inc
Cline No. 3
Gilbert, West Virginia

Gone Under Coal Company
Gone Under Coal
Oceana, West Virginia

M E D and H Coal Company Inc
M E D and H Coal
Davin, West Virginia

Southern Appalachian Coal Company
Hewitt 51 Surface
Julian, West Virginia

Southern Appalachian Coal Company
Bullcreek No. 4
Julian, West Virginia

Southern Appalachian Coal Company
Kimberly 35
Julian, West Virginia

Southern Appalachian Coal Company
Dicks Creek 36
Julian, West Virginia

Southern Appalachian Coal Company
5 Block No. 2
Julian, West Virginia

Southern Appalachian Coal Company
Bullcreek Prep Plant
Julian, West Virginia

Bethlehem Mines Corporation
Bethlehem Surface
Van, West Virginia

Bethlehem Mines Corporation
Bethlehem Mine No. 131 & 132
Van, West Virginia

Dal-Tex Coal Corporation
Dal-Tex Coal
Sharples, West Virginia

Deep Ford Mining
Deep Ford
Logan, West Virginia

K C & D Coal Company
K C & D
Gilbert, West Virginia

Cumberland Coal Company
No. 5 Mine
Vansant, Virginia

Ridgeland Coal Company
Ridgeland
Pocahontas, Virginia

Banner Run Coal Company
Banner Run
Bluefield, West Virginia

C and A Coal Company
C and A
Bluefield, West Virginia

United Pocahontas Coal Co
United Pocahontas No. 6A
Crumpler, West Virginia

United Pocahontas Coal Co
United Pocahontas No. 10
Crumpler, West Virginia

United Pocahontas Coal Co
United Pocahontas No. 14
Crumpler, West Virginia

United Pocahontas Coal Co
U P No. 14 Tipple
Crumpler, West Virginia

United Pocahontas Coal Co
United Pocahontas No. 16
Crumpler, West Virginia

United Pocahontas Coal Co
United Pocahontas No. 19
Crumpler, West Virginia

United Pocahontas Coal Co
Crumpler Tipple
Crumpler, West Virginia

United Pocahontas Coal Co
Wyoming and Zenith
Crumpler, West Virginia

Curtis Coal Company
Curtis Coal
Danville, West Virginia

Wren Coal Company
Wren Coal
Camp Creek, West Virginia

Chaffe Mining Company
Chaffe Mining
Beckley, West Virginia

Low Ash Coal Company
Low Ash Coal
Iaeger, West Virginia

New River Fuel Inc
New River Fuel
Madison, West Virginia

Boone Energy Coal Company
Boone Energy
Madison, West Virginia

Barrett Fuel Corporation
Barrett Fuels
Beckley, West Virginia

Eastern Associated Coal Corp
Wells Complex Plant
Wharton, West Virginia

McDaniel Mining Company
McDaniel Mining No. 2 Mine
Piney View, West Virginia

Empire Mining Inc
Empire Mining
Grundy, Virginia

Mine Technology
Mine Technology
Norton, Virginia

Pammlid Coal Company
Pammlid Coal
Summersville, West Virginia

Pyramid Mining Inc
Pyramid
Owensboro, Kentucky

West Virginia Department
of Mines/Paul Gillespie
Hugheston, West Virginia

Grimmett Brothers Inc
Snyder
Snyder, Texas

Bolt Mountain Energy
Bolt Mountain Energy
Danville, West Virginia

National Mines Corporation
No. 31 Mine
Wayland, Kentucky

National Mines Corporation
No. 32 Mine
Wayland, Kentucky

National Mines Corporation
No. 33 Mine
Wayland, Kentucky

National Mines Corporation
No. 34 Mine
Wayland, Kentucky

National Mines Corporation
No. 35 Mine
Wayland, Kentucky

National Mines Corporation
Stinson Prep Plant
Wayland, Kentucky

National Mines Corporation
Safety Department
Wayland, Kentucky

National Mines Corporation
Central Shop
Wayland, Kentucky

National Mines Corporation
Main Office
Wayland, Kentucky

Creighton Hills Coal Company
Carol Mine
Lardintown, Pennsylvania

Paramont Coal Company
Paramont Deep Mine Division
Wise, Virginia

Paramont Coal Company
Paramont Surface Division
Wise, Virginia

Paramont Coal Company
Paramont Coal Prep Plant
Wise, Virginia

Ridgeland Coal Company
Ramada No. 2
Thorpe, West Virginia

Ridgeland Coal Company
Ridgeland No. 3
Thorpe, West Virginia

December 1982

HOLMES SAFETY ASSOCIATION MONTHLY SAFETY TOPIC

Questions and Answers of Rescue and Recovery Operations Following Coal Mine Fires and Explosions

These questions and answers were prepared originally in 1928 by a committee of the National Mine Rescue Association.

The object was to standardize the procedure in connection with the recovery operations following mine fires and explosions, and at the same time set up that which would be instructive in training new miners for this emergency work.

After gaining experience, these questions and answers have been periodically revised and brought up to date by a committee appointed for this purpose, assisted by the general membership of the National Mine Rescue Association.

This latest revision (1977) was dedicated to the miners who lost their lives during firefighting and rescue and recovery operations in the coal mines of the United States. It is the wish of the committee that this revision will help to prevent any more loss of life in this way.

MINE GASES

1. Q. NAME THE COMMON GASES FOUND IN COAL MINES FOLLOWING A MINE FIRE OR MINE EXPLOSION.

   A. Carbon monoxide, carbon dioxide, and methane, oxygen, nitrogen, hydrogen, and other hydrocarbons.

2. Q. WHAT IS A DANGEROUS MINE ATMOSPHERE?

   A. A dangerous mine atmosphere is one that is or is likely to become poisonous to breathe, deficient in oxygen, or explosive.

3. Q. WHAT IS THE PRINCIPLE COMBUSTIBLE GAS FOUND IN COAL MINES?

   A. Methane (CH_4) is the principle combustible gas found in coal mines.

4. Q. WHAT IS THE EXPLOSIVE RANGE OF METHANE-AIR MIXTURES?

   A. Five to 15 percent of methane in air is explosive.

5. Q. TO WHAT EXTENT MUST THE OXYGEN CONTENT BE REDUCED BEFORE AN EXPLOSION OF METHANE AND AIR IS IMPOSSIBLE?

   A. For a mixture of strictly methane and air, the oxygen content must be 12 percent or less. It is, however, significant to note that there is a combination of combustible gases following explosions and during fires, so the maximum allowable oxygen will vary according to variations in the combustible and inert gases.

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6. Q. WHAT IS THE EXPLOSIVE RANGE OF CARBON MONOXIDE-AIR MIXTURES?

   A. 12.5 to 74 percent carbon monoxide in air.

7. Q. WHAT IS THE EXPLOSIVE RANGE OF HYDROGEN-AIR MIXTURES?

   A. Four to 74 percent hydrogen in air.

8. Q. TO WHAT EXTENT MUST THE OXYGEN CONTENT BE REDUCED BEFORE AN EXPLOSION OF HYDROGEN IS IMPOSSIBLE?

   A. Five percent or less.

9. Q. NAME THE INERT GASES FOUND IN COAL MINES.

   A. Carbon dioxide (CO_2) and nitrogen (N_2).

10. Q. STATE WHERE YOU WOULD GENERALLY FIND METHANE, CARBON MONOXIDE, AND HYDROGEN SULFIDE.

    A. Methane may be found anywhere, but is most likely to be encountered in virgin coal, roof cavities, high places, abandoned workings, and places that are improperly ventilated. Carbon monoxide may be found in small quantities after blasting and will be found after an explosion or in the return from a mine fire. Hydrogen sulfide may be found in old pipelines, stagnant water, fire areas and occasionally in active workings, usually associated with broken bottom.

11. Q. WHAT GAS OR GASES SUPPORT COMBUSTION?

    A. Only oxygen.

12. Q. HOW ARE PERSONS AFFECTED BY BREATHING THE VARIOUS GASES FOUND IN COAL MINES?

    A. 1. A deficiency of oxygen in the air being breathed deprives the body of the oxygen required for normal life support. Noticeable symptoms such as faster and deeper breathing, dizziness, rapid heart beat, and headache occur when the air contains as little as 15 percent oxygen; unconsciousness may occur when the air contains nine percent oxygen; and life is greatly endangered when the air contains seven percent oxygen. A flame safey lamp will no longer burn when the oxygen content is below 16.25 percent.

    2. Carbon monoxide breathed in air reduces the capacity of the blood to carry sufficient oxygen, which deprives the brain and body tissues of the oxygen they require for normal functioning. The generally accepted maximum allowable concentration for an eight hour exposure with normal oxygen is .005 percent. Somewhat higher concentrations may be considered allowable for short periods of exposure. For example, .04 percent can be inhaled for one hour, and .4 percent will cause death in less than an hour.

    3. Hydrogen sulfide in very small amounts will cause irritation of the eyes and respiratory passages, including the lungs; concentrations as low as .07 percent will cause rapid unconsciousness, cessation of respiration, and death.

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FIGHTING AND SEALING COAL MINE FIRES

13. Q. WHAT ARE THE MAJOR CAUSES OF FIRES IN COAL MINES?

A. Electricity, open flame, ignition of gas, explosives, cutting and welding, smoking and smokers' articles, spontaneous ignitions, friction, and surface fires communicated to underground workings.

14. Q. WHAT ARE THE USUAL METHODS OF CONTROLLING OR EXTINGUISHING MINE FIRES?

A. 1. Direct attack with water, chemcials, rock dust, or sand.
2. Foam.
3. Enclosing fire area with tight seals.
4. Flooding affected area or the mine.
5. Flushing enclosed area with silt or other material.
6. Enclosing fire area with inert barriers.
7. Inundating with inert gases.

15. Q. WHEN SHOULD YOU DECIDE TO SEAL A FIRE AREA OR MINE?

A. When it is no longer reasonably safe or feasible to fight the fire directly because of a build up of combustible gases, bad roof due to heat, insufficient firefighting materials, too large an area engulfed by fire, etc.

16. Q. WHAT IS THE OBJECTIVE OF SEALING?

A. The object is to control and extinguish the fire by cutting off the oxygen supply so as to reduce the oxygen below that which will support a flame or combustion; also to minimize or eliminate the possibility of an explosion.

17. Q. WHAT ARE THE PRINCIPLE HAZARDS IN SEALING A MINE FIRE?

A. When coal burns, explosive and asphyxiating gases are liberated or produced and the heat from fires causes roof falls. Therefore, the installation of seals, the roof falling, or other firefighting activity may cause an explosive mixture of gases to reach the fire causing an explosion. In addition, there is a potential for workers to be overcome by asphyxiating gases because of the need to work in the return airways and because of roof falls changing the pattern of ventilation. It is important that the air returning from the fire area be monitored for explosibility.

18. Q. SHOULD THE INTAKE OR RETURN BE SEALED FIRST, OR BOTH TOGETHER?

A. No fixed rule should be established for sealing, but the procedure must be governed by the conditions surrounding each fire. It is, however, preferable to erect both intake and return seals simultaneously. It may even be advisable to devise a method of having doors in the seals closed after all workers have returned to the surface.

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19. Q. WHAT DISTANCE SHOULD SEALS BE FROM A FIRE?

A. Conditions govern this. As the objective in sealing is to cut off the air so that oxygen will be consumed to the point that there is not enough oxygen to support combustion, the smaller the area sealed, the quicker this will be accomplished. Roof conditions, amount of combustible gases being given off, the intensity of the fire, and the number of seals required are the principle factors to be considered when selecting seal locations.

20. Q. SHOULD TEMPORARY SEALS BE ERECTED FIRST?

A. Not necessarily. Circumstances surrounding each fire will determine whether or not temporary seals should be erected. Factors to be considered when making this determination are the availability of permanent sealing material, the rate of rise of combustible gases, the rapidity of the spread of the fire, the accessibility of the seal locations, etc.

21. Q. WHAT MATERIALS SHOULD BE USED FOR TEMPORARY SEALS?

A. The most common and practical materials are those normally used within the mine such as brattice cloth, brattice boards, plastic material, and other sealing materials. Whatever the materials used, the edges should be sealed with urethane foam or other material to make them as air tight as possible.

22. Q. SHOULD WORK CONTINUE IN THE MINE AFTER SEALS ARE COMPLETED?

A. Emphatically, no! The main hazard after sealing a mine fire is the possibility of an explosion within the sealed area. All miners should be removed as quickly as possible after completion of work on the seals. Normally, no one should enter the mine when it is known that there is an explosive atmosphere within the sealed area. Samples to determine whether or not the atmosphere is explosive should be collected through boreholes from the surface whenever possible. Otherwise, the first trip into the mine after sealing should be for the purpose of collecting samples from the sealed area. The number of people making this trip should be limited to as few as necessary and how soon the trip should be made after seals are completed will depend to a large extent upon the size of the sealed area, the amount of combustible gases in the area when the seals were constructed, and the normal methane liberation in the area.

23. Q. WHAT ARE THE MAIN FACTORS TO BE CONSIDERED IN ERECTING PERMANENT SEALS?

A. They should be as air tight as possible and strong enough to resist slight concussions by being constructed of brick, tile, cement blocks layed in cement mortar and notched into the floor, ribs, and roof. Selected seals should be provided with a door that can be used for exploration or ventilation during recovery work. Selected seals, particularly those at high and low elevation points, should be equipped with sampling pipes or tubing with valves that extend through the seals at least into or beyond the first intersection. A thermocouple should also be placed at or near the fire area with connection to the outer side of one of the seals.

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UNSEALING FIRE AREAS IN COAL MINES

24. Q. WHAT DOES THE PRESENCE OF CARBON MONOXIDE IN SEALED AREAS INDICATE?

A. The presence of carbon monoxide is an indication of an active or recently active fire.

25. Q. HOW MUCH OXYGEN IS CONSIDERED REASONABLY SAFE BEFORE ATTEMPTING TO UNSEAL A FIRE?

A. The amount of oxygen under these circumstances is critical because of the possibility of explosion when unsealing a fire area. Ideally, the oxygen content should be such that the atmosphere in the sealed area is not explosive and cannot become explosive when air is added. Where this is not possible, the procedure for recovery should insure that miners are not in the mine when an explosive mixture exists in the sealed area unless the area has been examined and there is no fire.

26. Q. WHAT ARE THE PRINCIPLE FACTORS THAT GOVERN THE AMOUNT OF TIME A FIRE AREA MUST BE SEALED BEFORE BEING REOPENED?

A. Some principle factors are: Tightness of seals and enclosed area; influence of barometric pressure on enclosed area; character of burning material and overlying strata; extent and intensity of fire; location of seals with respect to mine ventilation; the extent of the area under seal; composition of gases in the sealed area.

27. Q. HOW WOULD YOU DETERMINE WHEN IT IS SAFE TO REOPEN A SEALED FIRE AREA?

A. When the temperature reaches normal and there is no carbon monoxide in the sealed area, it can be assumed that there is no longer active fire. There must be a sufficient period of time allowed for the area under seal to cool after the fire is extinguished before recovery operations begin. In addition, the atmosphere in the sealed area and procedure for recovery should be such that an explosive mixture will not be present in the sealed area while miners are in the mine unless the entire area has been examined and no fire exists.

28. Q. WHAT EFFECT, IF ANY, DOES THE PRESENCE OF CARBON DIOXIDE THAT IS PRODUCED IN THE SEALED AREA HAVE ON THE FIRE?

A. The amount of carbon dioxide present under these circumstances would have very little effect on the fire, but is a factor to be considered in determining whether or not the atmosphere is or may become explosive. Carbon dioxide may be introduced into a sealed area to help control the fire and help create an inert atmosphere.

29. Q. WHAT ARE SOME OF THE PREPARATIONS THAT SHOULD BE MADE BEFORE UNSEALING A FIRE AREA?

A. A complete and detailed plan should be prepared and agreed to by various interested parties. Necessary adjustments should be made in the ventilation to assure that an ample quantity of air

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will be available and that the air that passes by or through the sealed area is conducted in such a manner that it will not pass over power wires or any other potential ignition source and shall be directed by the shortest means to the surface. The area adjacent to the seals should be heavily rock dusted. The tools and supplies that will be needed should be placed at convenient locations.

30. Q. BRIEFLY DESCRIBE TWO METHODS THAT HAVE BEEN SUCCESSFULLY EMPLOYED FOR THE RECOVERY OF A FIRE AREA.

A. There are, in general, two systems that may be employed:

1. Recovering the fire area in successive blocks by means of air locks.
2. Reventilation of the fire area after there is conclusive evidence that the fire has been extinguished, or that the atmosphere is not explosive and will not become explosive with the addition of air.

31. Q. DESCRIBE THE METHOD OF RECOVERING A SEALED FIRE AREA BY THE USE OF AIR LOCKS.

A. The purpose of air locking is to recover portions of the sealed fire area or the entire area in a manner that will prevent increasing the oxygen content in unexplored areas to avoid an explosive atmosphere or rekindling or intensifying the fire.

When a suitable air lock has been erected, a proper organization and proper and adequate equipment and material provided, and all other necessary arrangements are completed, an oxygen breathing apparatus crew, fully equipped for the work at hand and supported by a fully equipped reserve crew, should enter the air lock through a man door and remove the seal.

After the seal has been removed, an oxygen breathing apparatus crew, with another crew in reserve, should advance and explore to the point where the next air lock is to be erected. General conditions should be observed by the exploring crew, temperature readings taken, an air sample collected to check previous analysis, measurements made for material required to construct the inby seals of the next air lock, then return to the fresh-air base. An apparatus crew or crews, with a reserve crew at the fresh-air base, should then construct a temporary seal with a door in it at the place previously selected for the next air lock, erect necessary temporary seals in crosscuts or other openings on the intake side and on the parallel entry or entries on the return side opposite the point selected for the air lock to insure resealing of the inby area, and examine any unexplored parts of the isolated area for possible fires. All crews should then be withdrawn from inside the air locks. Next, a seal on the return side should be opened by an apparatus crew; the air-lock doors on the intake side should be opened and air admitted to reventilate the area inside the air locks. Stoppings should be erected in open crosscuts on the return side to advance fresh air to the last crosscut which should be left open to provide a return. The quantity of air should be so regulated that the return will be kept below the lowest explosive limit.

After the newly explored area has been reventilated, fresh-air workers should erect a tightly constructed stopping with a door in it a suitable distance outby the one previously built to form the next air lock.

Advances as described above should be made by successive blocks until the entire area is recovered. As the work progresses, frequent analyses should be made to determine the composition of the atmosphere within the sealed area. The oxygen should be kept under control and within safe limits at all times. It is imperative that the oxygen be kept as low as possible at all times by limiting the infiltration of air to the sealed area as the work progresses.

32. Q. DESCRIBE THE METHOD OF RECOVERING A SEALED FIRE AREA BY DIRECT VENTILATION.

A. When a decision has been made to recover a sealed area by direct ventilation, an air lock should preferably be constructed near the intake seal. A rescue crew fully equipped for the work at hand breaks the seal, enters, observes conditions, takes temperature readings and air samples, and returns to the fresh-air base. If the observations and examination of the affected region have shown that conditions are favorable, the return seal should be broken by an apparatus crew, then the air lock opened to admit air. While the area is being ventilated, the combustible gases in the main return should, if feasible, be kept below the explosive limit. If this method of recovering a fire area is employed, it is advisable that all miners be out of the mine before the air is actually directed into the sealed area, unless it has been determined that the atmosphere in the sealed area is not explosive and cannot become explosive by adding air. Some automatic arrangement should be employed which would give sufficient time for all persons to reach the surface before the fire gases were actually moved. A reasonable period should be given for the fire gases to be removed and frequent determinations should be made of the return from the mine, and the time for any person to enter should be governed by the quality of the return air. If the workings under seal are of an extensive nature, it will probably be advisable for crews equipped with oxygen breathing apparatus to reenter the mine and clear out pockets of standing fire gases that may be present.

MINE EXPLOSIONS

33. Q. WHAT ARE THE PRINCIPAL CAUSES OF MINE EXPLOSIONS?

A. Ignition of methane or coal dust or both by electric arc, open flame (including mine fires), misuse of explosives, friction, etc.

34. Q. HOW CAN MINE EXPLOSIONS BE PREVENTED OR THEIR EFFECT MINIMIZED?

A. By adequate ventilation properly distributed, directed and controlled; complete rock-dusting of all open areas; use of sufficient water to allay dust from mining machines at working faces; use of permissible electrical equipment; use of permissible explosives, together with proper and adequate supervision to see that the above safeguards are instituted.

PROCEDURES AND DUTES AT FIRES AND EXPLOSIONS

35. Q. IN CASE OF A MINE FIRE OR EXPLOSION, WHO SHOULD BE NOTIFIED?

    A. Notify as soon as possible: higher company officials, State mining agency, Federal mining agency, representative of mine workers, safety department, engineering department, and maintenance department. Also, adjoining mines should be notified for possible assistance or to alert them if they are connected underground with the affected mine.

36. Q. WHAT ARE SOME FACTORS THAT MUST BE CONSIDERED EARLY TO ASSURE A WELL ORGANIZED OPERATION?

    A. Rope off and have police guard all roads leading to the mine. Establish a base of operation with ample room and communications. Establish special check procedures for acquiring necessary supplies.

37. Q. WHAT ONE FACTOR IS MOST CRITICAL TO INSURE THE SAFETY OF SURVIVORS IN THE MINE?

    A. The mine ventilation. The fan or fans should be examined and repaired as necessary, then attended or other action taken to assure continued operation.

38. Q. A MAJOR FACTOR TO BE CONCERNED WITH DURING RECOVERY FOLLOWING AN EXPLOSION IS THE POSSIBILITY OF ANOTHER EXPLOSION. LIST THE METHANE IGNITION SOURCES WHICH ARE MOST LIKELY TO BE ENCOUNTERED IN THE AFFECTED AREAS THAT HAVE NOT BEEN EXPLORED AND VENTILATED.

    A. 1. Fire that was started by the explosion.
    2. Electrical arc that may be created by short-circuited batteries, or power wires that have not been deenergized.

39. Q. IN ADDITION TO ASSURING THAT THE FAN OR FANS ARE OPERATING, WHAT IS ANOTHER IMPORTANT STEP TO BE TAKEN IN THE ATTEMPT TO SAVE SURVIVORS?

    A. Endeavor to communicate with survivors and direct them to the best means of escape from the mine.

40. Q. WHAT ARE THE MAIN OBJECTIVES OF THE RESCUE AND RECOVERY WORK AFTER A MINE EXPLOSION?

    A. 1. Miners entombed or missing should be located and brought to safety or their bodies recovered as soon as possible.
    2. Incipient or active fires should be located and extinguished or sealed off before an air current--possibly laden with explosive gas--is turned upon such a fire. If fire exists, unrestricted restoration of ventilation may fan it to greater intensity and make extinguishing it more difficult; or an explosion may occur, killing some or all of the miners still alive in the mine.
    3. Normal ventilation should be restored to all parts of the mine and all noxious gases swept out after the danger of fire has been found nonexistent or under control.

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41. Q. WHILE FIGHTING A MINE FIRE, WHAT TYPE OF MAJOR ACCIDENT SHOULD THE FIREFIGHTERS BE MOST CONCERNED WITH?

A. An explosion is the major accident that is likely to occur during firefighting operations.

42. Q. HOW SHOULD MINE FIREFIGHTERS PROTECT AGAINST THE OCCURRENCE OF AN EXPLOSION?

A. The air returning from the fire should be monitored for explosibility, and ventilation should be controlled closely and maintained over the fire constantly.

43. Q. SHOULD ONE PERSON BE IN CHARGE OF THE RESCUE OR RECOVERY WORK?

A. Yes, generally a representative of the company.

44. Q. SHOULD THERE BE AN ADVISORY COMMITTEE TO THE PERSON IN CHARGE OF THE RESCUE OR RECOVERY WORK?

A. Yes. The committee should be composed of representatives of the State mining agency, Federal mining agency, the miners, and others.

45. Q. SHOULD THERE BE A PLAN MADE FOR SPECIFIC PHASES OF FIREFIGHTING RESCUE AND RECOVERY PROCEDURES SUCH AS SEALING OR UNSEALING MINE FIRES OR RECOVERY OF MINERS FOLLOWING AN EXPLOSION?

A. Yes. The person in charge and the advisory committee should devise a relatively broad plan of operation which should be followed closely.

46. Q. WHAT ARE SOME FACTORS THAT MAY BE CRITICAL TO THE SAFE FIREFIGHTING OR EXPLOSION RECOVERY ACTIVITIES, AND WHICH WOULD NOT NORMALLY BE KNOWN OR READILY AVAILABLE TO THE PLANNERS?

A. Location of all energized power wires or equipment; location of all battery equipment or equipment on which batteries are installed; location of diesel equipment; location of explosives or oil storage areas; location of pressurized containers, such as acetylene or oxygen cylinders; and the location and description of any other equipment or supplies that may influence the planning.

47. Q. HOW SHOULD THE WORK BE DIVIDED?

A. Preferably, in four six-hour shifts per day, and the change of shift should take place underground at the fresh-air base or other work site so that work will be continuous.

48. Q. SHOULD THERE BE A PERSON IN CHARGE OF THE UNDERGROUND WORK ON EACH SHIFT?

A. Yes, generally a company representative with experience in such work.

49. Q. SHOULD THERE BE AN ADVISORY COMMITTEE TO THE PERSON IN CHARGE ON EACH SHIFT UNDERGROUND?

A. Yes. A committee should be composed of representatives of State mining agency, Federal mining agency and others as appropriate.

50. Q. SHOULD THERE BE ANY RESTRICTION ON THE NUMBER OF PEOPLE PERMITTED UNDERGROUND?

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A. Yes. Only those people necessary to insure the suitable progress and safety of the operation which would include supply people, backup workers, supervisors, etc.

51. Q. AFTER ENTERING A MINE FOLLOWING AN EXPLOSION, WHAT EXAMINATIONS SHOULD BE MADE?

A. Examine return airways for smoke or other indications of active fire.

52. Q. FOLLOWING AN EXPLOSION, HOW IS THE LOCATION OF THE FIRST FRESH-AIR BASE DETERMINED?

A. Exploration is continued in intake air to the point where normal ventilation controls have been destroyed and ventilation is short circuited. At this point, the first fresh-air base should be established.

53. Q. DESCRIBE A FRESH-AIR BASE.

A. The place to which fresh air has been conducted, and at which stoppings (seals) or other ventilation controls including an air lock have been installed in a manner that will prevent reventilation of any area that has not been explored and examined.

54. Q. WHEN SHOULD THE FRESH-AIR BASE BE ADVANCED?

A. Only when an area inby the present fresh-air base has been examined and stoppings installed to permit the explored area to be reventilated without disturbing the inby area that has not been explored.

55. Q. SHOULD EXPLORATION TRIPS BE MADE AHEAD OF THE FRESH-AIR BASE OR IN OTHER AREAS WHERE AN IRRESPIRABLE ATMOSPHERE IS OR MAY BE PRESENT?

A. Yes. Crews wearing self-contained breathing apparatus should make such trips for gathering information, reestablishing ventilation, rescuing workers, searching for bodies, etc.

56. Q. WHAT SHOULD BE THE DISTANCE OF TRIPS AHEAD OF FRESH AIR?

A. The object of the excursion; the type of communication used; conditions (such as height) of travelway, etc. will govern the distance to be traveled; always keeping in mind the time limitation of the apparatus.

57. Q. UNDER WHAT CONDITIONS IS IT NOT ADVISABLE FOR BREATHING APPARATUS CREWS TO MAKE TRIPS AHEAD OF FRESH AIR?

A. Such exploration trips should not be taken under the following conditions:

1. In dense smoke, except with life line attached to each member and then only for very short trips to save life, turn valves, or to open or close doors essential to the operation.
2. When an explosion is probable.
3. In dangerously high temperature with high humidity.
4. With apparatus not adequately charged or in unsafe condition.
5. When the reserve crew has less members than the advance crew.

58. Q. WHAT KIND OF MATERIAL SHOULD BE USED TO BUILD TEMPORARY STOPPINGS?

A. Workers wearing breathing apparatus should install temporary stoppings with plastic material, pogo sticks, inflatable stoppings, etc. Such stoppings should be replaced as soon as possible with more substantial stoppings such as cement block, wood-framed plastic sealed with rigid foam, or other more permanent type structure.

59. Q. WHAT SHOULD BE DONE BY BREATHING APPARATUS CREWS WHEN FIRES ARE FOUND DURING EXPLORATION?

A. Every effort should be made to reach and extinguish all fires discovered. If this is not possible, the crew should return to the fresh-air base and report the condition.

60. Q. SHOULD THERE BE A TELEPHONE OR OTHER MEANS OF COMMUNICATING BETWEEN THE FRESH-AIR BASE AND THE OUTSIDE?

A. Yes, so that miners and material can be provided without delay and that instruction and information can be relayed promptly between the person in charge underground and the person in charge on the surface.

61. Q. SHOULD THE PERSON IN CHARGE OF EACH SHIFT HAVE A MAP OF THE MINE?

A. Yes, so that progress can be followed, plans can be made, and information can be relayed accurately.

62. Q. SHOULD INFORMATION BE RELAYED TO RELATIVES OF POSSIBLE VICTIMS AND TO THE NEWS MEDIA?

A. Yes. Normally one spokesperson should be selected to relay factual information about the operation.

63. Q. WHAT SHOULD THE ENGINEERING DEPARTMENT BE RESPONSIBLE FOR DURING FIREFIGHTING OR RECOVERY OPERATIONS AFTER AN EXPLOSION?

A. 1. Provide up-to-date maps of the mine showing normal ventilation and ventilation controls (stoppings, overcasts, etc.).
2. Keep map current by recording progress, changes in ventilation, and other pertinent information such as location of bodies, equipment, etc.

64. Q. FOLLOWING A MINE EXPLOSION, WHAT EARLY ACTION SHOULD THE ELECTRICAL DEPARTMENT TAKE?

A. 1. Disconnect and lock out all electric power entering the mine or affected portions when authorized to do so, and lock out all other deenergized circuits.
2. Notify the electric company that under no circumstances should the electric power be "cut off" without notifying the mine.
3. If it is a shaft or slope mine, examine and service necessary hoists and elevators.

-MORE-

65. Q. WHAT ARE SOME OF THE DUTIES OF THE SAFETY DEPARTMENT DURING THE EARLY STAGES OF FIREFIGHTING OR EXPLOSION RECOVERY OPERATIONS?

A. Make arrangements for rescue teams including facilities and maintenance of equipment, food and lodging. Arrange for medical or first-aid treatment for injured persons or handling of bodies if necessary.

66. Q. WHAT MAIN TYPES OF WORKERS SHOULD BE ON EACH SHIFT?

A. Crews with breathing apparatus, crews to build stoppings, and crews to transport and handle supplies.

67. Q. WHAT ATTRIBUTES SHOULD A PERSON HAVE BEFORE BEING SELECTED AS A MINE RESCUE TEAM MEMBER?

A. The person selected should be a cool, competent person who has demonstrated in the past a willingness to be a good "team" member. The person should also possess extensive knowledge of mining and should be mentally sound and physically fit.

68. Q. WHAT TRAINING SHOULD A MINE RESCUE TEAM MEMBER HAVE BEFORE BEING QUALIFIED TO PARTICIPATE IN MINE RESCUE WORK?

A. They should be trained and retrained in accordance with Federal or State requirements for qualification.

69. Q. HOW MANY PEOPLE CONSTITUTES A RESCUE TEAM?

A. At least five and preferably six people should compose a rescue team with the same number fully equipped at the fresh-air base. A crew of less than five may make short excursions for special purposes when a similar number of apparatus miners are in reserve at the fresh-air base.

70. Q. WHAT EQUIPMENT SHOULD RESCUE PARTIES HAVE WITH THEM?

A. In addition to the standard equipment such as electric cap lamps and self-rescuers, they should be equipped with approved self-contained breathing apparatus that have been properly tested and inspected under the supervision of a competent person. They should have all the pertinent background information, a copy of the latest map of the mine workings, and at least an approved and tested methane detector, carbon monoxide detector, and oxygen detector.

71. Q. WHAT SHOULD THE CAPTAIN OF AN APPARATUS CREW CONFIRM BEFORE LEAVING THE FRESH-AIR BASE?

A. Make sure that all apparatus are operating properly and check to see that all material necessary for the exploration is on hand and working. The captain should consult with the person in charge relative to the purpose of the trip and extent of travel; also, be sure that a backup rescue team with all necessary equipment is in readiness at the fresh-air base.

-MORE-

72. Q. HOW SHOULD THE EXPLORATION AHEAD OF THE FRESH-AIR BASE BE CONDUCTED?

A. The rescue crew should advance in single file with six-foot intervals between members; carefully examine roof and roadway; check for toxic and flammable gases and oxygen; mark clearly for retreat your route of travel; mark on map and/or pad the conditions and materials found.

73. Q. WHAT COMMUNICATIONS SHOULD BE MAINTAINED WITH RESCUE TEAM AND FRESH-AIR BASE?

A. They must be in contact with the fresh-air base at all times, either by sound system or prearranged signals when a life line is used.

74. Q. WHAT LIFE LINE SIGNALS ARE RECOMMENDED FOR USE BETWEEN THE RESCUE CREW AND THE FRESH-AIR BASE?

A. For the purpose of standardizing signals on the life line, the following signals from the team to the fresh-air base or from the fresh-air base to the team are recommended for use: 1 pull--stop traveling or "all right" if at rest; 2 pulls--advance; 3 pulls--retreat (from fresh-air base to team--return at once); 4 pulls--distress. Horn or other audible signals between team members will be the same. Crew will keep life line stretched or taut at all times in order to be able to give or receive signals. When the crew is returning, the line should be rewound on the reel as they return.

75. Q. SHOULD APPARATUS CREWS RECOVER BODIES FROM UNVENTILATED AREAS?

A. Ordinarily, anyone encumbered with apparatus should not exhaust their strength in carrying bodies any great distance to fresh air.

December 1982

HOLMES SAFETY ASSOCIATION MONTHLY SAFETY TOPIC

The Silent Killer

Carbon monoxide is a gas which has neither color nor odor. Because it cannot be recognized by any of the human senses, it has been called the silent killer. Poisoning results from inhalation of the gas as the carbon monoxide combines with the hemoglobin of the blood. This action excludes oxygen and the victim suffocates. Carbon monoxide is very dangerous because even a small percentage in the air can cause sickness, and higher percentages can cause death.

Carbon monoxide is generated by the combustion of common fuels. It is produced by improperly adjusted oil and gas burners; by coal, coke, or charcoal fires when there is not enough air over the surface of the fire bed; and by internal combustion engines.

Because carbon monoxide is generated by incomplete combustion of fuels, cases of carbon monoxide poisoning increase during the cold-weather months when more fuel is used, both on and off the job. The generation of carbon monoxide cannot be stopped; so, make sure that the gas generated is piped to some point where it will not harm anyone, or that sufficient ventilation is provided to prevent the build-up of poisonous concentrations.

Burners and flues require proper maintenance to assure that the fuel burns efficiently and that the waste gases are carried away. DON'T ever permit the use of an open salamander in an enclosed area. See that it is equipped with a flue to the outside; or, if this is not practical, move the salamander to an area with sufficient ventilation.

The exhaust systems of internal combustion engines, both automotive and industrial, should be inspected frequently for leaks; if faulty parts are detected, have them replaced immediately. Remember, too, that no one should ever run an automotive engine in a closed garage. Finally, even though the exhaust system of an automobile has been recently inspected, it's impossible to tell when a leak might develop; hence the automobile should never be driven with all the windows closed.

December 1982

HOLMES SAFETY ASSOCIATION MONTHLY SAFETY TOPIC

Don't Overlook "Minor" Accidents

The importance of investigating so-called "minor accidents" is often overlooked by safety engineers. No doubt this is because the engineer is measuring severity by dollars and cents instead of by hazards and loss potential.

The term "minor accident" is a misnomer. Experienced safety engineers know that while there are minor injuries, there is no such thing as a "minor accident." The injury resulting from an accident sequence in no way indicates the severity of the hazard that produced it. Only investigation will determine this.

Safety studies reveal that once an accident sequence is set in motion, the degree of the resultant injury can neither be controlled nor predicted. In accident-prevention work, the importance of any accident lies in its potential for creating injury and not in the fact that it actually does or does not.

Many accidents do not result in injury or damage and are therefore called "near misses." These near misses should likewise be investigated and preventative comment made, because they represent a loss potential. In short, the attention of every engineer should primarily be directed to the cause of the accident -- not to the injuries or damage they cause.

TEN COMMANDMENTS OF SAFETY

I. Correct or report unsafe conditions, equipment, and tools.

II. Follow instructions, do not take chances; if you do not know--ask!

III. Do your part to keep everything clean and orderly.

IV. Use the right tools and equipment for the job; use them safely.

V. Use and repair equipment only when authorized.

VI. Use protective equipment; wear safe clothing.

VII. Do not commit horseplay; avoid distracting others.

VIII. When lifting, bend your knees; get help for heavy loads.

IX. Abide by all safety rules and signs; use common sense.

X. Report all injuries promptly; get first aid quickly.

December 1982

HOLMES SAFETY ASSOCIATION MONTHLY SAFETY TOPIC

Take Care To Insure A HAPPY HOLIDAY

We look forward to holidays. We plan for them in advance -- for weeks or even for months. We like to have them come so we can make it a long weekend. That's the way it should be.

There's a catch, though. The holiday we looked forward to may not work out the way we planned. Many things can happen to make it go wrong, but the worst of all is a bad accident -- the kind where someone is hurt or even killed.

This country has a terrible traffic accident record. Last year thousands were killed and well over a million disabling injuries occurred. Many hundreds of thousands had to be patched up in hospitals. A lot of the victims are crippled for the rest of their lives.

It isn't all caused by wild drivers, nor by heavy drinkers, although liquor plays an awful part in many of the worst accidents.

Too many accidents are the fault of ordinary everyday drivers who simply don't take their driving seriously enough. This shows up on weekends and particularly on long holiday weekends.

Just when everyone should put safety first, some drivers seem to think that getting there quickly is more important. They drive at speeds too high for conditions, especially hazardous winter weather. They take chances in passing. They cut curves. They crowd stop lights and pass stop signs, when they think they can get away with it.

Every one of them knows better -- or did before becoming involved in an accident. Such a driver's big mistake was not being safety-minded.

This safety consciousness wasn't there when it was needed most -- on the holiday.

In the fall, during hunting season, many accidents occur because hunters do not take all the precautions involved with guns.

During summer, others pour gasoline or kerosene on a barbecue to make it burn better. Sometimes it burns too well.

The thing that runs through all these accidents is that a little safety mindedness and the use of good common sense would have prevented them. This applies even to the freakish ones.

Very few people carry on activities on their holidays that are really dangerous. But everyone does things that can cause an injury if no thought is given to safety. Over and over again, the accidents prove it!

December 1982

HOLMES SAFETY ASSOCIATION MONTHLY SAFETY TOPIC

Before Christmas

This holiday time is a period of many varied activities both at home and elsewhere. The Holmes Safety Association wishes each of you a Merry Christmas and a Happy New Year. But, much of this happiness depends to a great extent on your individual work habits for this and the coming months.

There is considerable excitement during the month of December and the tempo increases to the day of celebration, Christmas Day. We are each caught up in the excitement of this festive season. Some of us might wish to pause, even during our working hours, and reflect on some activity planned or anticipated for Christmas, but you must resist this temptation or you may do something to injure yourself or some other person.

We each must face reality for we are concerned with earning a living for our families, and, in order to do this, we must be constantly alert to all possible hazards and keep in mind safe work practices. Any thoughts concerning outside activities should be placed in the backs of our minds and full attention centered on work duties.

Unfortunately, before, Christmas has not always been a happy one in the mining industry. This sobering thought should be a constant reminder to us that we each should always stay alert to our surroundings and perform our duties in the safest manner possible. Make Certain that everything is correct!

If you will always give your fullest attention to the various jobs at hand, then we can look forward to many glorious seasons such as the current one.

THE LAST WORD

DECEMBER

CORNUCOPIA

The turkey is not always the only casualty of the holiday.

Too often the family cook spends all day preparing the feast and then is unable to enjoy it because of an accident in the kitchen, the most dangerous room in the house. With organization and precaution the chef can be assured a safe and tranquil celebration by following these simple suggestions.

Get preparations organized a few days ahead of time. See that cooking utensils are convenient and in good condition. Any dishes that can be prepared in advance, should be fixed the day before and stored in the refrigerator.

Delegate specific before-dinner jobs to one or two helpers. Planning ahead saves nerves and time and prevents accidents caused by haste.

Keep "tasters" of all ages out of the kitchen. Because kitchens today are built compactly for efficiency and not for entertaining, a crowd results in confusion. This is the perfect setup for accidents.

And, remember to always follow these simple turkey tips:

T-Turn pot handles parallel to the front of stove.
U-Use pot holders.
R-Remember to wipe up spills immediately.
K-Keep cupboard doors closed.
E-Eliminate all tripping hazards.
Y-Youngsters should be kept out of the kitchen.

'TIS THE SEASON

Decking the halls for Christmas requires more than a creative hand with boughs of holly. Christmas decorations must be selected with safety in mind and used with care.

Christmas tree fires, a major holiday hazard, turn the season into a time of tragedy for more than a thousand families annually.

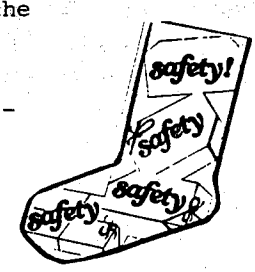
If you're going to have a natural tree, purchase a fresh one with springy branches and tight, green needles. Leave the tree outdoors in water or snow as long as you can.

Check strings of electric lights for worn insulation, broken plugs and loose bulb sockets. Replace damaged parts immediately.

Keep tree away from fireplace, radiator or other heat sources.

Never burn evergreen boughs or gift wrappings in the fireplace.

The giving and receiving of gifts is one of the high points of the holiday festivities-especially for the youngsters. Don't spoil the fun by giving an unsafe gift.



F-Find playthings that do not have points, sharp edges or removable parts.
U-Understand the abilities and age of the child and select your gift accordingly.
N-Note the Underwriter's Laboratories (UL) label on electrical toys.

And remember the best Christmas gift of all is LIFE.

The Holmes Safety Association
wishes you joy and safety throughout the year
MERRY CHRISTMAS!!

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HOLMES SAFETY ASSOCIATION
MEETING REPORT FORM

For the month of _______________

TOTAL meetings held this month ___________

TOTAL attendance this month ______________

Chapter Number __________ (See address label, if incorrect, please indicate change.)

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- -

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The Joseph A. Holmes Safety Association was founded in 1916 by 24 leading National organizations of the mining industries.

The Joseph A. Holmes Safety Association is named to commemorate the first director of the Bureau of Mines for his efforts in reducing accidents and illness throughout the mineral industries.

The following is the different award criteria:

Type "A" Awards - For Acts of Heroism

The awards are medals with Medal of Honor Certificate.

Type "A" - For Acts of Heroic Assistance

The awards are Certificates of Honor.

Type B-1 Awards - For Individual Workers

(40 years continous work experience without injury that resulted in lost workdays)
The awards are Certificate of Honor, Gold Pins and Gold Decal.

Type B-2 Awards - For Individual Officials

(For record of group working under their supervision)
The awards are Certificate of Honor.

Type C Awards - For Safety Records

(For all segments of the mineral extractive industries, meeting adopted criteria)
The awards are Certificate of Honor.

Other Awards - For Individual Workers

(For 10, 20, or 30 years without injury resulting in lost workdays)
The awards are 30 years-Silver Pin and Decal, 20 years-Bronze Pin and Decal, 10 years-Decal bearing insignia.

Special Awards - For Small Operators

(Mine operators with 25 employees or less with outstanding safety records)
The awards are Certificate of Honor.

Contact: HSA Office

Department of Labor
MSHA, Holmes Safety Association
4800 Forbes Avenue, Room A268
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