

**University of Missouri at Rolla  
Mine Rescue Contest  
The Phil Blair Mine  
October 8<sup>th</sup> and 9<sup>th</sup> , 1998**



**UNIVERSITY OF MISSOURI AT ROLLA MINE RESCUE CONTEST**  
THE PHIL BLAIR MINE  
Oct 8 &9 1998  
ROLLA, MISSOURI

**PROBLEM SOLUTION**

**Introduction**

The contest problem mine has a shaft for hoisting and lowering personnel and equipment. There is a skip attached to the bottom of the cage. A bore hole services the exhaust air and serves as an escape shaft. The shaft reaches the 1000ft level. Ventilation for the mine is established by a fan on the 1000ft level at the bore hole. The mine is on negative pressure with the main shaft used as an intake air way. Face ventilation is by auxiliary fans and vent bag.

The loader operator had just finished mucking out the face of the hanging wall drift and had move the loader to the maintenance area. While mucking out the drift the operator hit the wall damaging the fuel tank and fuel was leaking from the tank. Additionally the parking brake had been hanging up and dragging causing the braking system to become red hot. Unknown to him the machine had caught the fuel on fire as he parked the unit at the maintenance shop at the intersection of the hanging wall [hwall] & footwall [fwall] drift.

After getting off the machine he was exposed to the flame he grabbed a fire extinguisher and attempted to put the fire out. In the process his clothing caught fire. He ran around the corner into the footwall drift at 4 Xcut and rolled in the water ditch. He was severely burned and died as a results as he had burned his lungs. During the team briefing the team will be told that the mine manager shut the main fan off. The fan has controls on the surface and in the mine.

**Problem**

1) After the team is briefed on the problem and arrives at the fresh air base they will meet the judges, exchange introduction and start the clock. At that time they will receive a copy of the mine map, team briefing information, and mine information sheet. They will have to prepare their equipment for the rescue operation once this is completed the team will have to check the intake and exhaust air ways. At the exhaust air shaft they will find dense black smoke. **There is an odor of rubber burning. At the intake air way at the main shaft will have clear air.**

2) A gas check at the bore hole will show dark black smoke and a gas placard will indicate O<sub>2</sub>-16.5%, CO-2000ppm, NO<sub>2</sub>-200ppm and CH<sub>4</sub>-0.25%. **(Note the mine is non-gassy the CH<sub>4</sub> is residue caused by the heating of the fuel at the fire.** The company had put some plank over the raise to reduce the natural ventilation and reduce the amount of oxygen going into the mine. There is some leakage. The team can then get ready to enter the mine. At the station the team can enter the cage and use the shaft signals to request the cage be lowered to the mine level. There is a skip below the cage for hoisting ore. The entrance into the skip pocket is by a ladder located in a man-way next to the shaft.

3) On arriving at the shaft bottom the team will find the air clear. There is an operable phone at 2Xcut. The team can tie in the Hwall drift and the center header. Two (2) Xcut dead-ends into the pillar. There is water under ankle deep in the intersection and at the sump. The sump pump is on. At the center header and The footwall drift there is a permanent stopping. A gas test must be made across this intersection.

4)The team will find water ditches entering the center header from the Hhall & Fwall leading to the sump. At 3Xcut and the fwall drift there is a permanent stopping. Again the team must do a gas check across this intersection. After tying these areas the team can move to the hanging wall drift and move toward the maintenance area often called the Hwall/Fwall intersection the 2 rock formations come together at this point. On entering any intersection the team must do gas checks across each opening in the intersection. They will note an empty water ditch on the pillar side of the drift and loose roof on the Hwall. The team captain must address the loose roof to the team each time they pass this site. On returning the #5 man must indicate to the team that there is loose roof, this is a team endangerment for not acknowledging the loose each time they pass the area. The loose cannot be scaled.

5) There is an air and water line noted on the Hwall side of the drift and leading towards the footwall hanging wall intersection. At about 20ft. from the intersection there is a water manifold and 50 ft. of water hose coiled along side of the drift. There is a dense smoke placard located at the entrance to the maintenance area. A dark black smoke and a gas placard are located at the entrance to the shop area it reads O<sub>2</sub>-16.5%, CO- 200PPM, NO<sub>2</sub>-200PPM AND CH<sub>4</sub>-0.60% There is a front end loader on fire burning in the shop. It should be noted that the intersection was never broke through. There is solid between the footwall and the hanging wall sides of the drift On reaching the intersection the team will note dense smoke. The front end loader is on fire the left rear tire is burning and there is a fuel oil fire burning in the water ditch at the front of the loader. Three (3) of the tires have been consumed by fire. The 4th tire is burning and the fire has consumed most of the fuel. There are 6 barrels of grease and oil stored in a corner that has not caught fire. They can then use the water to control the tire burning and cool the oil and grease.

6] If the team uses the water hose to put out the tire fire first they will wash burning diesel fuel down the water ditch. The # 1 judge will move the diesel fuel fire placard down the drift 5ft for each 5 seconds the team delays in using a fire extinguisher to put the fire out. Once the fire extinguisher is used the fuel fire will be extinguished. They can then use the water to extinguish the burning tire. Once the fire is out the team can advance towards 4 Xcut . If the team did not report the 0.25 %CH<sub>4</sub> reading found at the air shaft when they did that gas test prior to going underground they must go to a phone and report this information to the fresh air base as per #3 judge rule 15. They will be docked for not doing this prior to going underground.

7] In moving on down the Hwall the team will again find loose roof on the hwall side and again the team captain must acknowledge this to the rest of the team. Three (3) Xcut was blocked so the team cannot go more then 3 ft past 4 Xcut in the hanging wall drift or they will be docked.

The 2 crosscut plus three ft rule is in effect. SEE RULE #9 #1 judge. They will note a fan with a vent bag on the corner of 4 Xcut and the Hwall drift.

After completing a gas check at the intersection they can enter 4 Xcut about half way down the drift they will find a badly burned body lying in the water ditch. The team must do an initial assessments to determine the miner is dead. Failure to conduct an initial assessment will be docked as per #3 judge rule #2a.

8] If the team should enter the hwall drift past 4 Xcut they will find a barricade with 2 miners behind it a gas reading will indicate O<sub>2</sub>-19%, CO-1200%, NO<sub>2</sub>-105PPM AND CH<sub>4</sub>-0.10%. They will be docked for entering this area at this time. They must tie the complete mine before they can enter the barricaded area. One of the miners was injured while erecting the barricade a rock from the roof hit him on his left shoulder. The blow indicated a possible broken collar bone and put a gash in his left upper arm. [see first aid problem] The #2 miner is having trouble breathing he was exposed to the mine atmosphere, namely nitrogen dioxide at 200ppm. [see #2 first aid problem].

9] On the right side of the drift in 4 Xcut there is an auxiliary fan with vent bag for face ventilation. There next move should be to inform the miners that they need to explore and find a way to remove the gas from the mine to lower the gas levels. If the team removes the miners however the hi NO<sub>2</sub> at 105ppm will get them a 100 pt dock.50 for each miner. There are 2 sets of barricade timber located in the footwall drift towards the end of the drift. They can retrieve this material..

10] In 4 Xcut there is the start of the water ditch there is water in the ditch. The ditch extends to the sump. They will find a dead miner lying in the ditch the team must do an initial assessment on the miner before they are told that he is dead . At 4 Xcut and the fwall drift there is a gas placard that shows O<sub>2</sub> at 16.5%, CO .2000ppm, NO<sub>2</sub> at 200ppm and CH<sub>4</sub> at 0.60% They can advance down the footwall drift following the water ditch to the stopping at 3 Xcut. They must do a gas check across this intersection the results will not change from the previous placard.

11] On entering the area south of 3 Xcut the team will find the air raise/escape shaft and main fan The fan will have on off controls on the fan. Advancing south of the fan there will be an auxiliary fan and vent bag serving to cool the substation. The fan will be off. The fan was just installed by the foreman. At the substation there will be 4 switches controlling: 1. the auxiliary fans 2. The sump pump 3.The Fuel pump 4. The Main fan. The all of the switches will be **ON/OFF** switches with trip switches with automatic resets which protect the motors from over heating. Once the motor cools the switch will reset itself the motor will not start until the unit is again energized. Controls for these switches are located on the equipment both under ground and on the surface.

12] Control for the auxiliary fans will be **ON** and the controls for the sump pump will be **ON**. There is a working phone located at the substation. **THE TEAM CAN START THE MAIN**

**FAN AFTER GAINING PERMISSION FROM THE FRESH AIR BASE.** They need to turn on the auxiliary fan cooling the substation.

13] The team can then retreat to the barricaded area, conducting gas tests as they go. Note there has been a ventilation change. All gas placards except the one in the end of the hanging wall drift can be turned over the fresh air placard at the maintenance area can be left as is the gas placards must be turned over. Any test made can be confirmed by the #1 judge as clear air the team must make these test back passed the fire area before they can clear the mine.

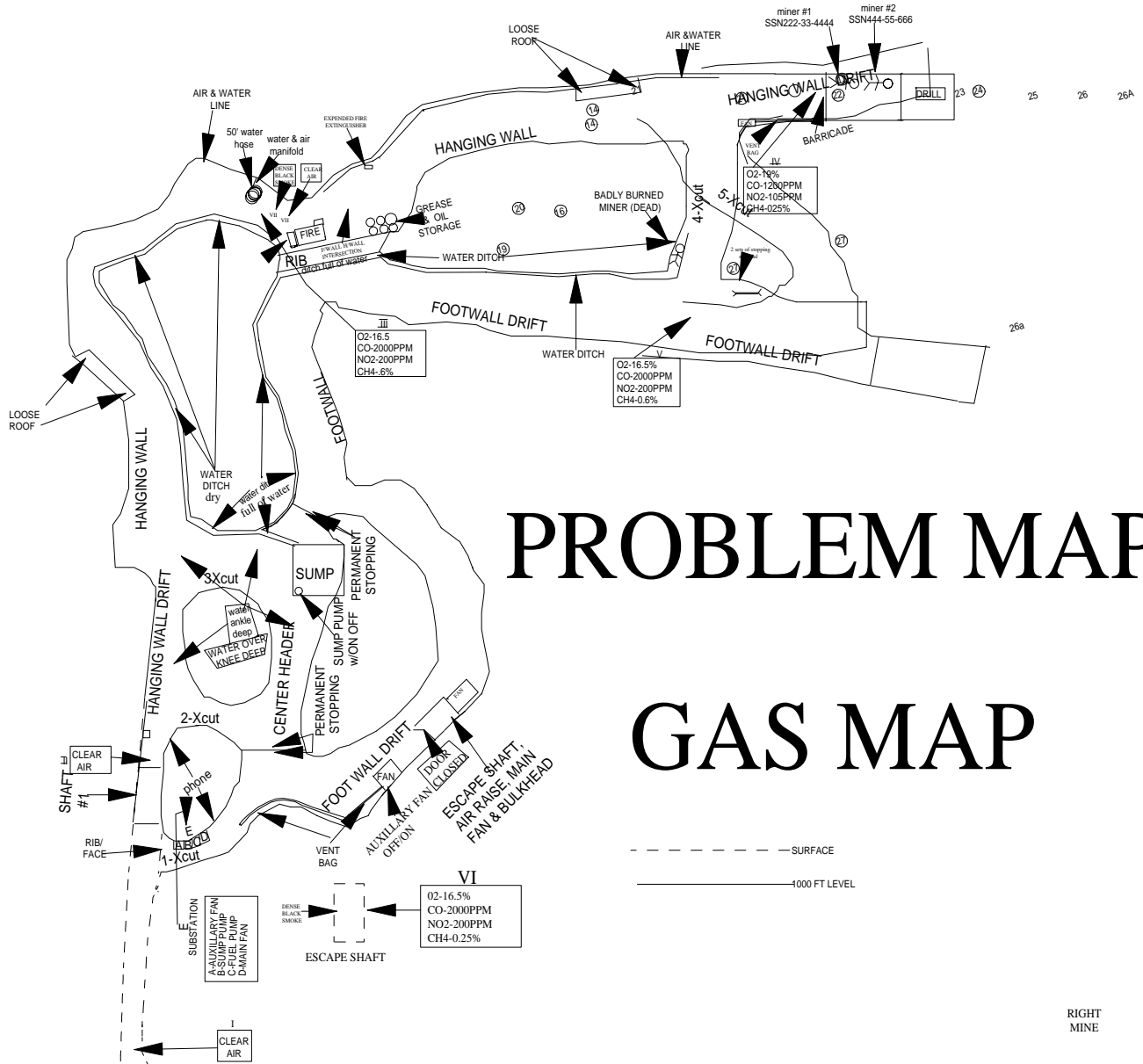
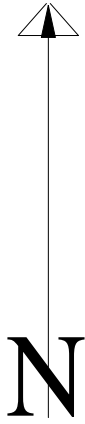
14] The team has only to turn on the auxiliary fan furnishing ventilation to the barricaded drift to remove the gas. As the team proceeds towards the barricade the #1 judge will tell the team captain that he has just barfed into his face piece and that he must pull the face piece off his head and fall to the ground. He has just suffered a heat stroke and become unconscious. The team must then load him on the stretcher and move him to the surface. The co-captain will then assume the position of captain and move the team to the surface. En rout the team will pass loose roof at 2 locations the acting team captain must acknowledge this to the team. The team back up #6 man will have to join the team to complete the problem.

15] On the way back into the mine the team Must do gas checks at each entry leading up the Hwall drift The air will be clear in the mine. the team will find if they look at the water placards that while they were on the surface the sump pump had over heated and kicked out.. If they check the placards they will find water over knee deep.

16] If they walk through the water they will be docked 75 points. They have only to call the surface and request that the sump pump be turned on. This pump has an automatic reset and after over heating and then cooling the pump can be turned on from the surface controls. The team could allow on of the team member to turn the pump on by walking through the water and turning on the switch at the pump. Once turned on this will pull the water down to ankle deep and the team can proceed to remove the 2 trapped miners

17] They can open the barricade without building a stopping after they communicate with the miners as to the conditions behind the barricade. The conditions will be ok. They must conduct a survey on each of the 2 people trapped in the mine. Conducting the required tests on each of the trapped miners as per the first aid instructions attached and as indicated in item #8 They can then place the injured miner with breathing problems on a stretcher and bring the miners to the surface.

16] The team can finish their map and turn it in and shut the clock off.



# PROBLEM MAP

# GAS MAP

RIGHT MINE

## PROBLEM ORIENTATION

### UMR REGIONAL MINE RESCUE CONTEST Rolla Mo. Oct. 8th & 9th 1998 The Phil Blair Mine.

THE TEAM WILL BE PREBRIEFED ON THE PROBLEM PRIOR TO ARRIVING AT THE FRESH AIR BASE. THEY WILL BE GIVEN AN OPPORTUNITY TO OBSERVE THE TAPED INFORMATION AND TO STUDY THE TEAM BRIEFING INFORMATION FOR 10 MINUTES.

1. When the team arrives at the fresh air base introduce yourself to the team as the mine manager and #1 judge and introduce #2 & #3 judges to the team.
2. Provide the team with the following instructions.
  - (A) I will give the team captain and the fresh air base attendant a copy each of the Team Briefing Information and Mine Map. No briefing questions will be answered by the Mine Manager concerning the team briefing statement. The mine manager will respond to questions only as required by the rules while working the problem.
  - (B) The fresh air base attendant and alternate will be required to locate at a designated location where they can study the map and team briefing information. They can assist the team and answer any questions the team may ask. they cannot go down the shaft with the team unless he becomes a member when the replace a team member.
  - © I recommend that you unfold the map and review it with the team briefing information.
  - (d) You will start the clock before reviewing the Team Briefing Information, mine information & Mine Map.
3. Caution - Fresh Air Base Attendant and Mine Rescue Team Alternates are not to speak to anyone during the working of the problem. The fresh air base attendant may talk to the team members and the Judging Officials.
4. Ask if they understand these instructions? If not repeat items #2 & 3.
5. When they verify understanding the instructions start the clock then present the team briefing information sheet and map to the team.

## TEAM BRIEFING STATEMENT

You have arrived at the Phil Blair Underground Experimental Copper Mine. The mine is owned and operated by the Phil Blair Corporation. Copper ore was discovered in this area during oil drilling exploration some years ago. The mine is an experimental operation to determine ore quality through out the ore zone. Several parallel drifts were driven several years ago between a natural hanging and footwall drift. The hanging and footwall drifts came together and the indication was the ore ended at that point. Recent exploration indicates the ore body made a turn at that intersection and the ore opened up again and is continuing in an Easterly direction.

The experimental PHIL BLAIR Mine is being operated on a single level. The mine opened by a single vertical shaft and an air raise/escape shaft extending to the 1000 ft. level. The shaft is for men, supplies and ore skipping. The air shaft is used as an exhaust air shaft and secondary escape shaft from the mine. A portable man hoist and 2 man cage is available for emergency use.

At quitting time last night the night shift blasted a 12ft. drift round in the face of the hanging wall drift. The ore was mucked out by the front end loader earlier today. Plans were to drill another round in the face of the drift and blast going off shift. Additionally the front-end-loader operator was to service the front-end-loader after he finished mucking out the drift. Two driller and the front end loader operator are the only 3 miners in the mine.

The foreman came out of the mine early, he also serves as our electrician we have been having problems with our power center over heating he has installed an auxiliary fan at the face of 1Xcut next to the air raise. We feel that cooling the air in the area will prevent the trip out problems that have been occurring. Were not sure what has taken place underground except that there is dense smoke coming up the air shaft. We put a few boards over the shaft to reduce the natural ventilation out of the mine. We tried calling the shaft station phones underground and got no answer.

If you are ready and willing the service of your mine rescue team is needed. It is now 6:30 PM, your team will be the first team to enter the mine. We want you to give us a damage report extinguish or seal all fires, account for all missing miners and map all accessible areas of the mine. The hoist has been checked out and is working ok.



### Mine Information

- Geology** The mine is located in the sedimentary rocks a copper porphyritic formation located in the Inglewood formation. The formation is from 6 to 8 ft. thick. A highly mineralized disseminated replacement deposit in which the copper minerals occurred through out a large volume of the rock which is commonly called porphrey make up the ore body. The formation rolls above and below the 1000 ft. plane Between a roof of competent sand stone and a slate floor.
- Gas** The mine does not have a history of methane. The mine is not classified as gassy.
- Water** The mine 1000 foot level has consistently produced about 300 to 1000 gallons of water per minute. The pump normally handles the inflow of water that comes from the face regions drifts via the water ditches. **THE SUMP IS 12 FT DEEP.**
- Waterlines** There are water lines with manifolds located through out the mine. The water is used for dust control and fire protection. The sump pump water line underground runs from the sump to the surface via the main shaft. The line will easily handle the volume of water produced from the sump located in the center header drift between 2 and 3 Xcut. The pump has controls next to the sump, at the substation and on the surface.
- Airlines** There is a 2-inch diameter air line down the No. 1 shaft. There are air manifolds at the #1 shaft stations and run to the face regions. They are used to operate air driven drills and air Tuggers. The air lines are charged by a surface compressor that produces 1000 cubic feet of air per minute at 120 pounds per square inch.
- Electricity** The underground electric power is on. A 4160 volt power feeder cable runs down the air shaft to a portable transformer and feeder Sub-station located in 1 Xcut. It services the entire underground mine. We have dual controls and can control the power from either the surface or underground the power is on and available for use. The switch gear in the mine is designed to automatically reset when the power is dropped because of over heating. The main fan has controls on the fan and on the surface

**Ventilation** The #1 shaft is down cast. The air shaft is upcast. The mine ventilation system operates on negative pressure. A 50 HP axi-vane fan is located at the air shaft in the footwall drift. The fan was shut down when smoke was noted coming up the exhaust shaft. The fan can be controlled from both the surface and underground.

**Mining Equip.** All mining equipment is electric, air and Diesel powered.

**Notification** **ALL FEDERAL, STATE AND LOCAL OFFICIALS HAVE BEEN NOTIFIED.**

**Backup Team** We expect a backup team to arrive shortly. They should be here by the time you get ready to go underground.

**Mine Map** The mine map was up-to-date as of the of yesterday.

**Other Mines** This mine is a continuation of a mine that was in operation during the early 1960's. We know of no other mines in the area.

**Explosives** Explosives are available and are not stored underground.

**Materials** All available equipment and materials to work the problem is located in the mine and identified by placards.

**Hoist** The man hoist has been checked out and is working ok. The skip pocket is assessable through a manway at the shaft.

**Guards** Guards have been posted at the mine entrance. **THE POWER CONTROLS ARE IN THE ON POSITION AND ARE GUARDED..**

**Roof Support** Most roof support is by roof bolts and timber sets.

Page 3

**Timber Yard** There is 2 by 4 timber, brattice cloth, support timber, and cribbing material available underground. **At the present time we have stored this material in the foot wall tail drift past 4 Xcut.**

**Phone's** There is a phone located at bottom of the #1 shaft and one at the power center in 1 Xcut. During any emergency the phone has a direct line to the manager's office on the surface. You may contact him at any time from the mine phone.

**Shop** There is a small shop located at the intersection of the hanging wall and footwall drifts.

# FIRST AID DISCOUNT SHEET

## MINER # 1

### #3 JUDGE

\_\_\_ THE MINER WAS STRUCK ON THE SHOULDER BY A ROCK FALLING FROM THE BACK ( Roof) WHILE BUILDING THE BARRICADE . AS THE VICTIM IS CONSCIOUS, EXPLAIN WHAT YOU ARE GOING TO DO BEFORE YOU PERFORM THE HEAD TO TOE SURVEY. BE REASSURING AT ALL TIMES.

#### PRIMARY SURVEY

- \_\_\_1. Establish responsiveness.
- \_\_\_2. Position victim.
- \_\_\_3. Check Breathing.
- \_\_\_4. Check Pulse.
- \_\_\_5. Visually check for bleeding. **THERE IS A COVER BANDAGE ON THE MINERS SHOULDER THAT WAS PLACED THERE BY MINER# 2. THE BANDAGE IS SOAKED INDICATING THERE HAS BEEN HEAVY BLEEDING. THE SHOULDER IS DEFORMED INDICATING A POSSIBLE BROKEN COLLAR BONE.**

#### SECONDARY SURVEY

- \_\_\_1. Neck - Gently feel and look for any abnormalities. Check for medical alert necklace.
- \_\_\_2. Head - Without moving the head, check for blood in the hair, scalp lacerations, and contusions. Gently feel for possible bone fragments or depressions in the skull.
- \_\_\_3. Chest - Check the chest for cuts, impaled objects, fractures, and penetrations (sucking) wounds by observing chest movement.  
**THE LEFT SHOULDER IS DISLOCATED WITH A DEEP CUT ON THE OUT SIDE OF THE ARM ABOUT 4 INCHES LONG. THE ARM MUST BE DEMOBLIZED AND SECURED UNTIL IT IS BANDAGED PROPERLY AND A SLING INSTALLED.**
- \_\_\_4. Abdomen - Gently feel the abdominal area for cuts, penetrations, and impaled objects, observing for spasms and tenderness.
- \_\_\_5. Lower back - Feel for deformity and tenderness.
- \_\_\_6. Pelvis - Check for grating, tenderness, bony protrusions, and depressions in the pelvic area.
- \_\_\_7. Genital region - Check for any obvious injury.
- \_\_\_8. Lower extremities - Check for discoloration, swelling, tenderness and deformities which are sometimes present with fractures and dislocations. Stroke soles of feet for paralysis.
- \_\_\_9. Upper extremities - Check for discoloration, swelling, tenderness, and deformities which are sometimes present with fractures and dislocations. Stroke palms for paralysis. Check for medical alert bracelet.  
forearm and hand in a triangle or cravat bandage sling.
- \_\_\_10. Back surfaces - Injuries underneath the victim are often overlooked. Examine for bony protrusions, bleeding, and obvious injuries.
- \_\_\_11. Secure victim to the stretcher with bandages or straps one on body and one around legs (minimum) cover with blanket.

**FIRST AID DISCOUNT SHEET  
MINER # 2**

**#3 JUDGE**

**PRIMARY SURVEY**

- 1. Establish responsiveness. **THE LIPS, EAR LOBES, AND FINGER NAILS ARE BLUE.**
- 2. Position victim.
- 3. Check Breathing. **HAS A BREATHING PROBLEM CAUSED BY EXPOSURE TO NO2. THE TEAM MUST PUT HIM UNDER OXYGEN.**
- 4. Check Pulse **RAPID HEART BEAT**
- 5. Visually check for bleeding.

**SECONDARY SURVEY**

- 1. Neck - Gently feel and look for any abnormalities. Check for medical alert necklace.
- 2. Head - Without moving the head, check for blood in the hair, scalp lacerations, and contusions. Gently feel for possible bone fragments or depressions in the skull.
- 3. Chest - Check the chest for cuts, impaled objects, fractures, and penetration (sucking) wounds by observing chest movement.
- 4. Abdomen - Gently feel the abdominal area for cuts, penetrations, and impaled objects. Also observe for spasms and tenderness.
- 5. Lower back - Feel for deformity and tenderness.
- 6. Pelvis - Check for grating, tenderness, bony protrusions, and depressions in the pelvic area.
- 7. Genital region - Check for any obvious injury.
- 8. Lower extremities - Check for discoloration, swelling, tenderness and deformities which are sometimes present with fractures and dislocations. Stroke soles of feet to check for paralysis.
- 9. Upper extremities - Check for discoloration, swelling, tenderness, and deformities which are sometimes present with fractures and dislocations. Stroke palms to check for paralysis. Check for medical alert bracelet.
- 10. Back surfaces - Injuries underneath the victim are often overlooked. Examine for bony protrusions, bleeding, and obvious injuries.
- 11. Secure victim to the stretcher with bandages or straps by placing one on body and one around legs (minimum). Cover with blanket.

**FIRST AID DISCOUNT SHEET  
MINER # 2**

**#3 JUDGE**

**PRIMARY SURVEY**

- \_\_\_ 1. Establish responsiveness.
- \_\_\_ 2. Position victim.
- \_\_\_ 3. Check Breathing. HAS A BREATHING PROBLEM CAUSED BY EXPOSURE TO NO2.  
THE TEAM MUST PUT HIM UNDER OXYGEN.
- \_\_\_ 4. Check Pulse.
- \_\_\_ 5. Visually check for bleeding.

**SECONDARY SURVEY**

- \_\_\_ 1. Neck - Gently feel and look for any abnormalities. Check for medical alert necklace.
- \_\_\_ 2. Head - Without moving the head, check for blood in the hair, scalp lacerations, and contusions. Gently feel for possible bone fragments or depressions in the skull.
- \_\_\_ 3. Chest - Check the chest for cuts, impaled objects, fractures, and penetrations (sucking) wounds by observing chest movement.
- \_\_\_ 4. Abdomen - Gently feel the abdominal area for cuts, penetrations, and impaled objects, observing for spasms and tenderness.
- \_\_\_ 5. Lower back - Feel for deformity and tenderness.
- \_\_\_ 6. Pelvis - Check for grating, tenderness, bony protrusions, and depressions in the pelvic area.
- \_\_\_ 7. Genital region - Check for any obvious injury.
- \_\_\_ 8. Lower extremities - Check for discoloration, swelling, tenderness and deformities which are sometimes present with fractures and dislocations. Stroke soles of feet for paralysis.
- \_\_\_ 9. Upper extremities - Check for discoloration, swelling, tenderness, and deformities which are sometimes present with fractures and dislocations. Stroke palms for paralysis. Check for medical alert bracelet.  
Treat 2 inch wound to the outside of the upper left arm.
  - A. Apply the pad of a sterile bandage compress over the wound.
  - B. Pass the ends several times around the arm and tie them over the pad.
  - C. Place the center of a cravat bandage over the pad.
  - D. Pass the ends, around the arm, cross them, continue around the arm and tie the pad.
  - E. Place the forearm and hand in a triangle or cravat bandage sling.
- \_\_\_ 10. Back surfaces - Injuries underneath the victim are often overlooked. Examine for bony protrusions, bleeding, and obvious injuries.
- \_\_\_ Secure victim to the stretcher with bandages or straps one on body and one around legs (minimum) cover with blanket.

# PLACARDS

1

# 1-SHAFT



1A

EXPENDED  
FIRE  
EXTINGUISHER

2

**CLEAR AIR**

3

MANWAY TO  
SKIP POCKET

4

PHONE

5

WATER  
OVER  
KNEE DEEP

6

**SUMP**

7

SUMP PUMP  
W/ON OFF  
SWITCH

8

DITCH FULL OF  
WATER



9

# PERMANENT STOPPING

10

**LOOSE ROOF**

11

WATER DITCH  
EMPTY

12

AIR AND WATER  
LINE

12a

**WATER MANIFOLD**  
**ON OFF**

13

**WATER  
MANIFOLD  
& 50 FT. HOSE**

14

**50 FT HOSE**

15

# DIESEL FUEL BURNING



16

**OIL AND GREASE  
DRUMS**

17

FRONT END  
LOADER ON FIRE.  
3 TIRES HAVE  
BEEN CONSUMED,  
THE 4<sup>TH</sup> IS  
BURNING.

18

**BURNING TIRE**

19

USE RIB

20

HANGING WALL &  
FOOTWALL  
INTERSECTION

21

**LOOSE ROOF**

22

BADLY  
BURNED  
MINER

23

**BARRICADE**



24/#1

LIVE MINER

222-333-4444

25 /#2

LIVE MINER

444-55-6666

26

**DRILL**

26A

FACE

26a

2 SETS OF  
STOPPING  
MATERIAL

*27*

DITCH FULL  
OF WATER

28

MAIN FAN  
ON OFF

29

ESCAPE SHAFT,  
AIR RAISE &  
MAIN FAN  
BULKHEAD



30

**DOOR CLOSED**

31

AUXILLARY  
FAN

31 a

AUXILLARY FAN

ON OFF

32

VENT BAG

33

FACE

B

SUMP PUMP  
ON OFF

TRIPPED  
ON OFF

C

FUEL PUMP  
ON OFF

TRIPPED

ON OFF

D

MAIN FAN

ON      OFF      REV

TRIPPED

ON      OFF



E

SUBSTATION

ON OFF

TRIPPED

ON OFF

I

CLEAR AIR

II

CLEAR AIR

# III

$O_2$ -16.5%

CO -2000 PPM

$NO_2$ -200PPM

$CH_4$ -0.6%

# IV

$O_2$ -19%

CO-1200PPM

$NO_2$ -105PPM

$CH_4$ -.0.25%

V

16.5%

2000PPM

CH<sub>4</sub>-200PPM

CH<sub>4</sub>-0.6

# VI

$O_2$ -16.5%  
CO-2000PPM  
 $NO_2$ -200PPM  
 $CH_4$ -0.25%

VII

CLEAR AIR



VII

DARK BLACK  
SMOKE

17

FRONT END  
LOADER ON FIRE.  
3 TIRES HAVE  
BEEN CONSUMED,  
THE 4<sup>TH</sup> IS  
BURNING.

