

Missouri S&T Mine Rescue Contest 2008

Team Briefing

You have arrived at the Missouri S&T mine. Thanks for responding to our emergency situation.

A two man maintenance crew and supervisor, reported to the mine at 6:00 am to prepare to go underground. The 2 man crew and the mine foreman went underground at 6:30 AM to begin maintenance work. At 8:00 AM I began calling into the mine for an update of their progress but was not able to reach anyone. I started into the mine but ran into smoke a short distance from the mine opening. I immediately retreated to the surface and called for help.

Efforts are still being made to contact the crew by radio communications but no one has responded.

The local fire department was notified and were first to arrive. The fire department rescue team did not attempt to go into the mine because they had no means for traveling in irrespirable atmospheres.

Currently the power is off underground. The fan has been turned off as well.

All government (federal, state and local) agencies have been notified and are on site. If you are ready and willing, the service of your mine rescue team is needed.

We want you to:

- examine the mine in its entirety
- account for all missing miners and bring live ones to the surface,
- and map all accessible areas of the mine.

A backup mine rescue team has just arrived and is available should you need them.

Good Luck!

MINE A

Missouri S&T Mine Rescue Contest 2008

26th Annual

MINE INFORMATION

MINE ACCESS	<p>MS&T Mine is a dolomite mine with four openings; an adit and 3 vertical shafts.</p> <ul style="list-style-type: none">• The adit is an intake airway, primary escape way, and the main travelway for men and materials.• A 6' diameter shaft is equipped with an exhaust fan to assist in ventilating the mine.• An additional 5' diameter shaft has been developed and acts as an intake to improve mine ventilation.• The third shaft is an 8' diameter skip shaft used to convey mined material to the surface. This shaft also acts as an emergency secondary escape way. The shaft is equipped with airlock doors on the surface to assist with controlling mine ventilation. Currently the doors are closed.
BACKUP TEAM(S)	<p>One fully equipped backup mine rescue team has just arrived and is available should you need them. Additional teams are en route.</p>
EXPLOSIVES	<p>Explosives are available and stored on the surface.</p>
ELECTRICITY	<p>A 4160 Volt power line enters the mine by way of a lined borehole. The line feeds a non permissible power center which is used to power the permanent pump.</p>
GAS	<p>The mine has a non gassy mine classification.</p>
GEOLOGY	<p>The MS&T mine is located in the Ozark dolomite formation. All of the development to date has been driven with consistent heights. The seam undulates throughout the mine.</p>
MATERIALS	<p>All materials to work the problem are located underground or on the surface at the fresh air base and are identified by placards.</p>
MINE MAPS	<p>The mine map was last updated on September 24, 2008.</p>
MINING EQUIPMENT	<p>Non-permissible diesel scoops are used for mine rehabilitation.</p>

NOTIFICATION All federal, state, and local officials have been notified.

OTHER MINES There are no other mines in the area.

PHONES No mine phones are in use. Radios are used for communication.

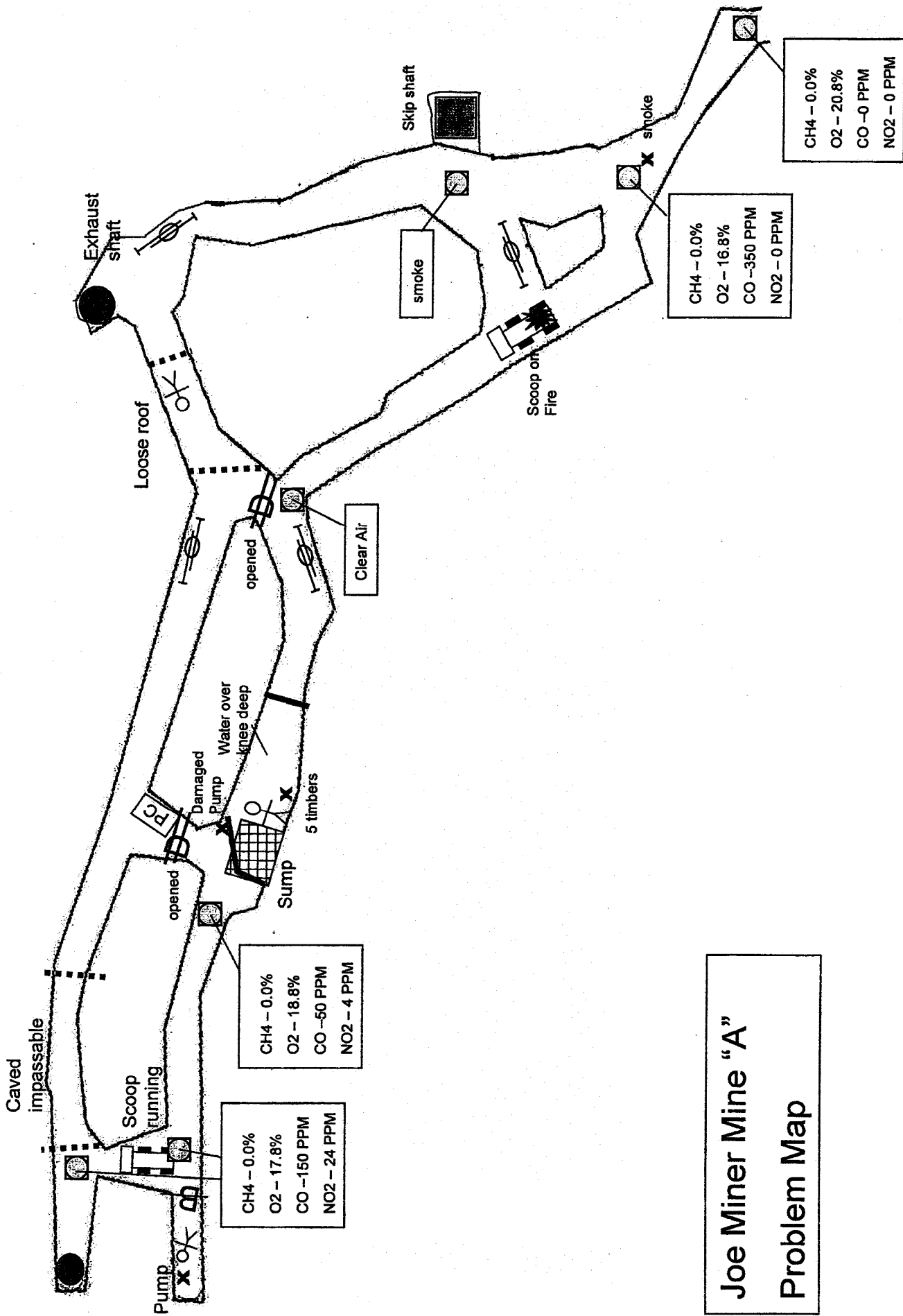
REFUGE CHAMBERS None available at this time.

ROOF SUPPORT Point-anchor resin bolts are used in varying lengths for primary roof support. Bolts are installed using portable roof drills. Wooden posts and roof jacks are planned for secondary support.

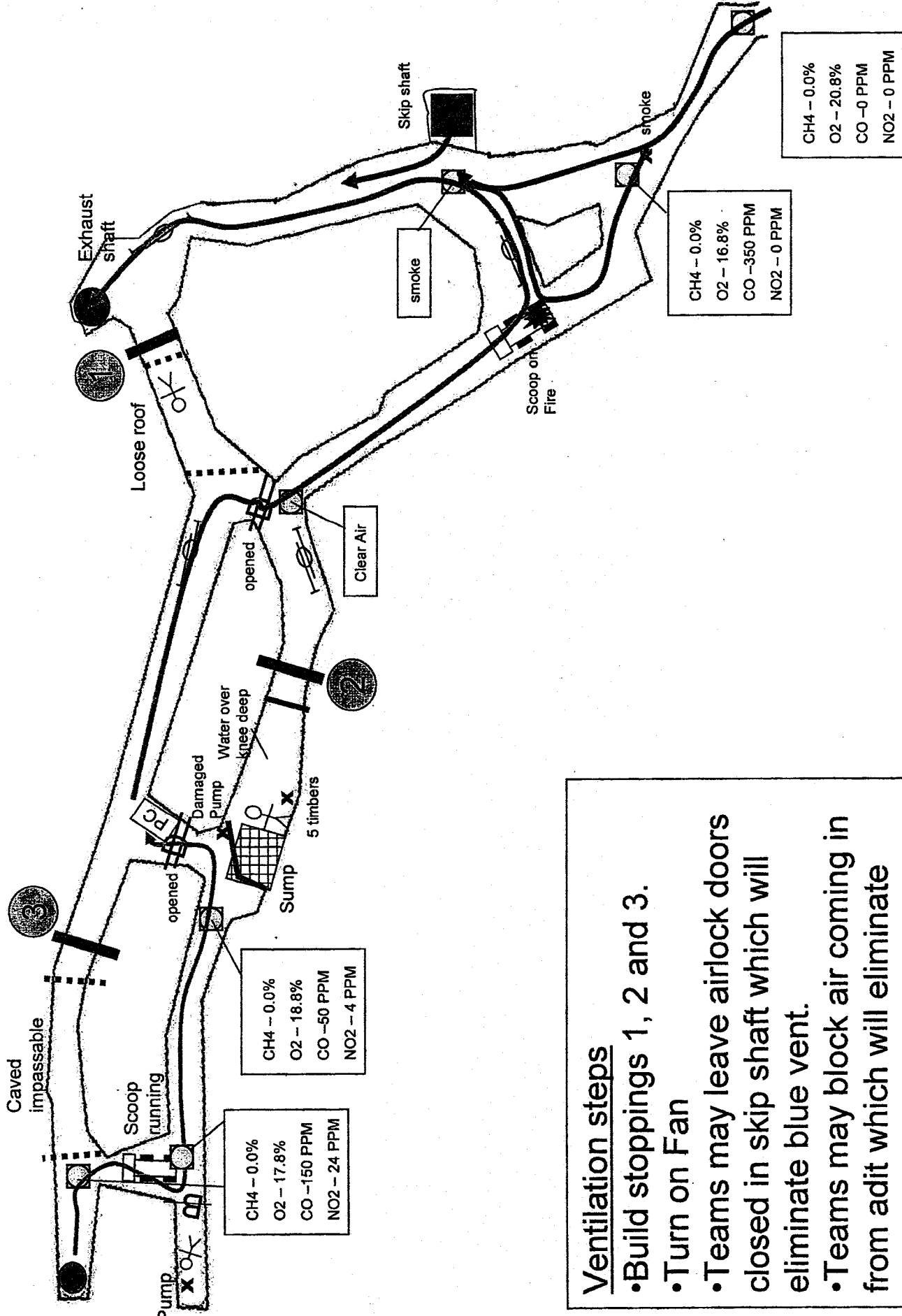
VENTILATION One 60-inch diameter Joy axi-vane fan, capable of inducing 50,000 cfm is used to ventilate the mine. The fan is located on the surface at the 6' diameter exhaust ventilation shaft. The fan is NOT reversible.

WATER A stationary permissible pump with suction line and an auxiliary sump have been established in the mine. The pump is used to pump water out of the mine. The pump is powered from the underground power center. The discharged water is pumped through a 6" lined borehole into a treatment lake.

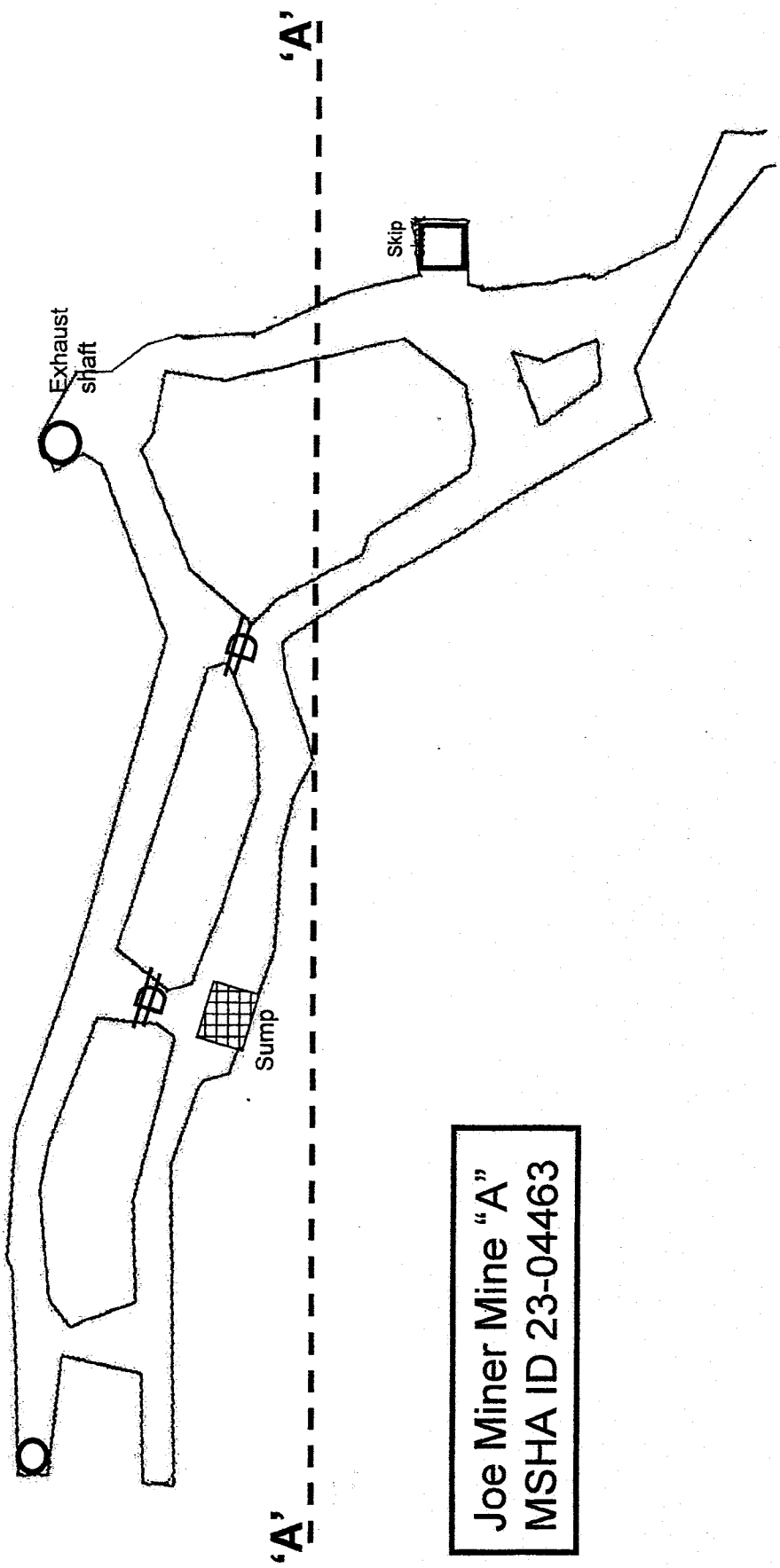
On occasions, portable pumps are used in various locations throughout the mine.



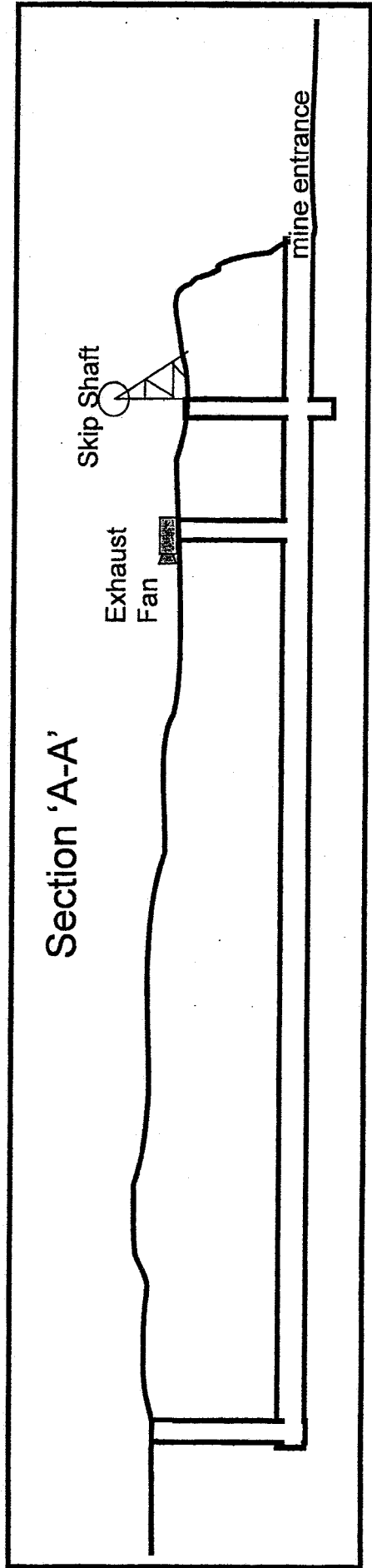
Joe Miner Mine "A"
Problem Map



- Ventilation steps**
- Build stoppings 1, 2 and 3.
 - Turn on Fan
 - Teams may leave airlock doors closed in skip shaft which will eliminate blue vent.
 - Teams may block air coming in from adit which will eliminate green vent.



Joe Miner Mine "A"
 MSHA ID 23-04463



Solution for Rolla 2008 Mine Rescue Problem

1. The team will report to the fresh air base and have the normal introductions. When the team is ready they will start the clock and will be handed the maps and the problem.
2. The teams should review the information that was given them. Gas checks can be made at the portal prior to going under oxygen, where they will find normal air.
3. The team should then go under oxygen and prepare to go underground.
4. The team must count off entering the mine and must make their first team check underground within 50' with all team members underground.
5. The team will continue to travel the main drift and will encounter a smoke placard at the first cross cut. The team must count off prior to entering smoke each time.
6. The team will make the necessary gas checks in the intersection.
7. For the purpose of this solution the team will elect to travel up the right drift to the second intersection. There they will find a skip shaft. In the crosscut they will find a set of building materials.
8. Continuing to try and tie in and behind they will find a scoop on fire. The team must immediately check the back and use their fire extinguishers to put out the fire. Once the fire is extinguished the team can tie back to the first intersection.
9. The team can then proceed up the right drift toward the exhaust shaft where they will encounter another set of building material. And the exhaust shaft. Continuing to explore they will encounter loose ground with an unresponsive victim laying under the loose ground.
10. The team will then retreat back to the second intersection and proceed up the left side. In the third intersection the team will find a clear air placard as well as an open door. The team should proceed through the open door to tie in the back side of the loose ground.
11. The team may elect to travel the left drift toward the sump area where they will find another set of building material and water over knee deep. They will also see an unresponsive victim sitting in the water.
12. The team will then retreat back to the 3rd intersection go through the open door and proceed in the right drift to intersection four.
13. In this intersection they will find an open door and may proceed through the door toward the sump. At the sump they will find an inoperable sump pump.
14. The team may proceed in the left drift toward intersection #5 where they will encounter a gas placard with CH₄ 0.0, O₂ 18.8, CO 50 ppm, NO₂ 4 ppm. Continuing to the #5 intersection they will find a barricade with a live person behind it that can tell them of the conditions behind the barricade. The gas readings in front of the barricade are CH₄ 0.0, O₂

17.8%, CO 150 PPM, NO2 20PPM. The NO2 readings are too high for the barricade to be opened safely. The team should inform the victim of the conditions outside the barricade and tell him they will have to clear the air before they can rescue him. The team can continue to try and tie in and behind but will find caved impassable ground. The team may elect to retreat back to the fourth intersection and tie in the caved impassable.

15. Once they have tied in and behind the team can explore toward the vent shaft located at the end of the mine.
16. With all accessible areas explored the team must ventilate the mine to rescue the miner behind the barricade. To ventilate and to protect the two miners that are currently inaccessible the team will have to build three temporary stoppings. One will need to be built between the loose ground and the exhaust shaft. The second between the 3rd intersection and the water over knee deep. The third one between the caved impassable and the 4th intersection. Once these are built the team can request that the fan be turned on. The air will travel down the vent shaft across intersection #5 through the open door in intersection #4 through the open door in intersection #3, through intersection #2 and out the exhaust shaft. Air will also be pulled in the portal and out the exhaust shaft. This will clear the mine of smoke and gases and will not ventilate over unexplored areas.
17. The team will need to make gas checks where smoke and gases were moved to assure that the area is clear of contaminates.
18. The team can now enter the barricade and rescue the miner who has no injuries and can walk out with the team. The team will find a water pump they can use to pump the excess water around the sump. Once the water is pumped they will find a victim who is dead as well as timbers. These timbers can be used to secure the loose ground and make it safe to retrieve the remaining victim. This victim is also dead.
19. With the entire mine explored and all missing miners accounted for the team will exit the mine turn in their maps and stop the clock.