

**I Can't Get Enough Air**  
**Problem Booklet**

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## **Instructions**

Read the problem described on the next page. Then answer the 9 questions. Do them one at a time. Don't jump ahead, but you may look back to earlier questions, earlier figures, and your answers. Some questions tell you to select as many answers as you think are correct. Other questions ask you to select only one answer unless you are told to "Try Again!" Follow the directions for each question.

After you have selected your choice to a question, look up the number for that choice on the answer sheet. Rub the special pen between the brackets for that choice. A hidden message will appear that tells you if the choice is correct and provides you with additional information. When you finish you will learn how to score your performance.

## **I Can't Get Enough Air**

### **Background**

You are the section foreman on the 17 Left longwall development section at the Paula Ann No. 3 mine. You are also a member of the mine rescue team.

You and eight other miners are working on the section today.

The coal seam height varies between 58 and 62 inches. Entries and crosscuts are 20 feet wide, and are on 100' centers.

This section has 3 entries and has been driven 4,000 feet from the 4 West mains.

The crew travels to and from the section in the #2 entry in a rail-mounted battery powered mantrip.

The mine uses belt haulage and there is a 48 inch belt located in #3 entry. The belt entries are on a separate split of intake air that moves inby from the dumping point to the section. There is a pager phone at the belt feeder.

The primary escapeway is the #2 intake air course, while the secondary escapeway is in the #1 return airway. At 4 West Main, the primary continues to follow the track and the secondary escapeway follows the left side return.

Everyone is wearing a 60-minute person-wearable self-contained self-rescuer (SCSR) on their belt. You also have 10 person-wearable SCSRs cached at intervals of about 1,500 feet in the primary escapeway in crosscuts between the primary and secondary escapeways.

You and your crew had hands-on SCSR training 6 months ago.

You do not have a hand-held CO detector.

### **Problem**

One of your shuttle car operators took a call from the fireboss saying that there is smoke from an unknown source coming into your section. You attempted to contact someone on the pager phone to find out where the smoke was coming from, but got no response. You and your crew then tried to evacuate down the intake escapeway riding the mantrip, but encountered heavy smoke at #30 crosscut. You therefore decided to go through the mandoor at #31 crosscut and travel on foot down the belt entry that is on a neutral split of air. Turn the page and study Figure 1, then turn to question A.

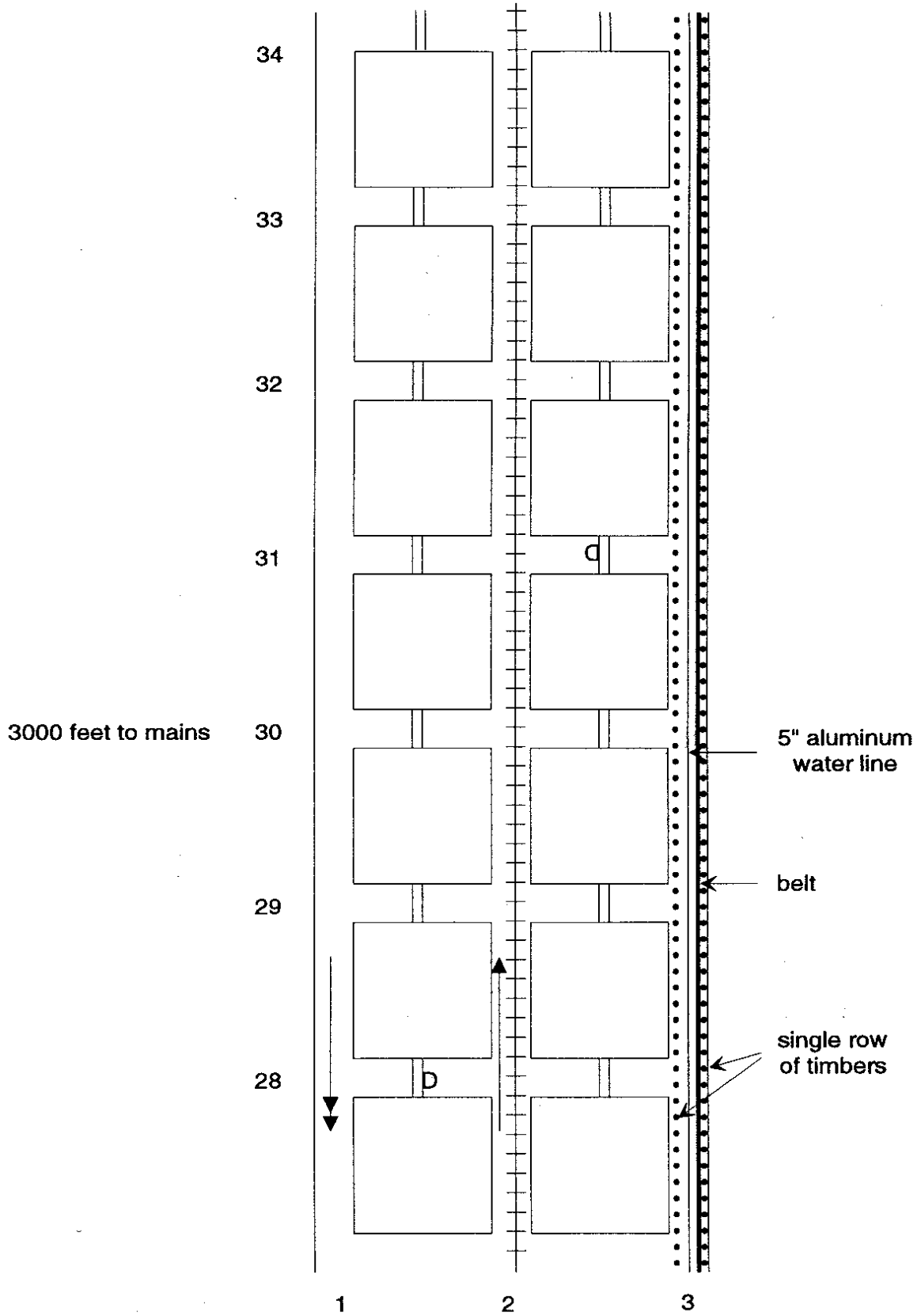


Figure 1: Section map for 17 Left (not to scale)

**Question A**

You and your crew go through the mandoor at #31 crosscut into the belt entry. The air is clear and you travel about 6 crosscuts, at which point you find light smoke. What should you do now? (Select as MANY as you think are correct.)

1. Watch the smoke for a while to see if it subsides.
2. Tell everyone to don their SCSR now.
3. Tell everyone to open their SCSR and loop it around their neck, but not to activate the apparatus.
4. Take your crew, lead them back to the section, and go out the return escapeway.
5. Check the time.

When you have made your selection(s) do the next question.

**Question B**

You decide to tell the crew to put on their SCSRs now. You check the time. It's 11:10 A.M. As you and your crew start to don the SCSRs you notice that several miners are having trouble. You observe that the breathing bags on their apparatus are not inflated. What should you do now? (Choose only ONE unless told to "Try Again!")

6. Tell the miners to exhale several breaths into the apparatus to inflate the breathing bag.
7. Remind everyone that they must activate the oxygen on the SCSR.
8. Tell the miners having trouble that the devices are not working, and to take them off. Tell them that they will probably be able to escape barefaced.
9. Tell the mechanic, who has his SCSR on, to go back to the SCSR cache in the primary escapeway and bring back more units.

**Question C**

The miners who had trouble had forgotten to activate the starter oxygen on their SCSRs. You realize that before continuing you need to check everyone to be sure that they have their SCSR on properly. You look for the following: (Select as MANY as you think are correct.)

10. Mouthpiece in, with lips over the flange and the miner biting on the lugs.
11. Nose clips on securely and positioned properly.
12. Goggles on, with nose bridge seated properly and the strap above the ears.
13. The apparatus carried securely under the miner's arm in such a way that there is no tension on the breathing hose.
14. No kinks and twists in the breathing hose that might restrict breathing.
15. The waist strap is tucked out of the way in the bottom of the unit.

When you have made your selection(s) do the next question.

**Question D**

When everyone gets their SCSR on successfully, you move out. The smoke is heavier now and the visibility is less than 40 feet. The SCSR mouthpiece is gagging you, your throat is dry, you're sweating under your goggles, and the noseclips are hurting your nose. You have traveled about 25 crosscuts when the miner operator in your crew pulls the SCSR mouthpiece out and yells, "I don't think this SCSR is working. I can't get enough air!" What do you do? (Select as MANY as you think are correct.)

16. Take your mouthpiece out and tell the miner that you are only a few breaks from another air split. Tell him to take the unit off and continue barefaced.
17. Motion for the miner operator to put the mouthpiece back in and not to talk.
18. Since you are close to another air split, signal for one of the other miners to share his SCSR with the miner operator.
19. Take the miner operator's SCSR and breathe through it to be sure that it is working.
20. Stop with your crew so that they can rest for a moment.

When you have made your selection(s) do the next question.



## **Question E**

You stop the crew to take a rest. (See Figure 2.) After a couple of minutes, you see that the miner operator is no longer outbreathing the unit. While you are stopped, the mechanic decides to go outby and check the 4 West return and intake escapeways. He comes back and signals you and the crew to follow. When you go through a door, you come into the return escapeway and find that the smoke is not as thick. What should you do now? (Choose only ONE unless told to "Try Again!")

21. Continue your escape by leading your crew down the return escapeway instead of the belt line since the smoke is not as thick.
22. Tell your crew to take their mouthpieces out and save their SCSRs since the smoke is not as thick in the return and there is not as much CO.
23. Have the crew wait in the return escapeway while you go to a mine phone to find out where the fire is.
24. Send a miner into the primary escapeway to locate a cache of SCSRs and bring extras back for the crew.

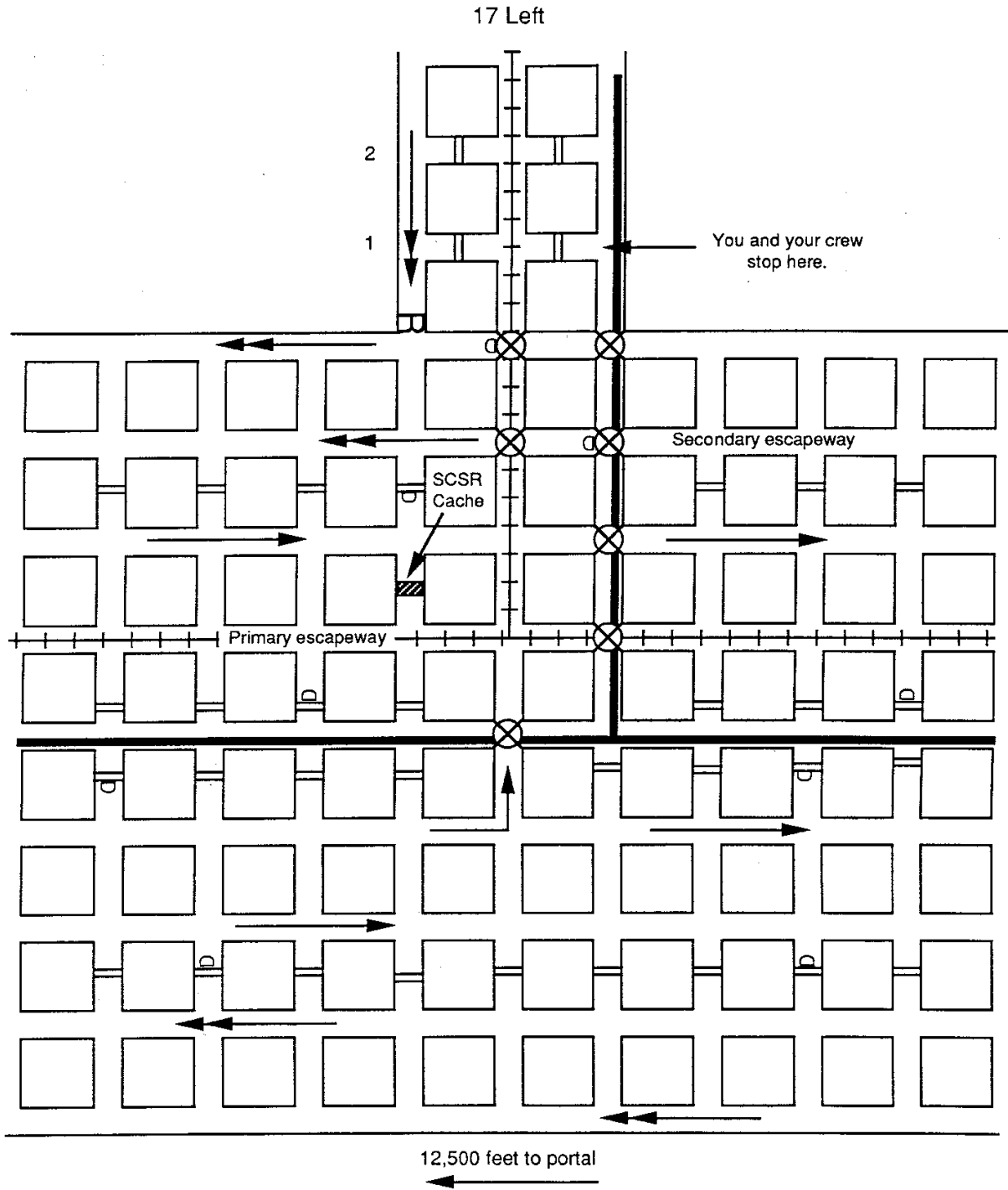


Figure 2: Map of 17 Left and 4 West Mains intersection

**Question F**

You and your crew continue down the 4 West return escapeway at a moderate pace, checking into the primary escapeway periodically. The smoke continues to be lighter in the return and the visibility is about 100 feet. After you travel 10 more crosscuts in the return, you begin to have trouble breathing from your SCSR. It feels like you are not getting enough oxygen from the apparatus. You check your watch and realize that you have been wearing the device for about 30 minutes. What should you do now? (Choose only ONE unless told to "Try Again!")

25. Take the apparatus off since it's probably depleted and you will smother if you don't.
26. Slow down your pace and motion to everyone to do the same.
27. Take several breaths of outside air and blow the bag back up to make breathing easier.
28. Pull the mouthpiece out slightly and breathe around it to get more air.

**Question G**

You and your crew slow your pace and travel another 4 crosscuts. The primary escapeway still has heavy smoke and you are still having trouble breathing from your SCSR. Some of the other miners are also having trouble breathing. You've been under apparatus for about 35 minutes. You can barely see a sign up ahead indicating there is a cache of SCSRs in the primary escapeway. What should you do now? (Select as MANY as you think are correct.)

29. Stop with your crew where the SCSR cache sign is located so that they can rest for a moment.
30. Continue traveling down the return escapeway. You need to get to good air as quickly as possible.
31. Take your crew into the primary escapeway, lead them to the SCSR cache, and signal them to don a new SCSR immediately.
32. Take two other miners with you to the cache in the primary escapeway, motion for them to take enough SCSRs for everyone to have a spare, and to get back into the return escapeway.

When you have made your selection(s) do the next question.

## **Question H**

You stop with your crew near the mandoor leading to the SCSR cache. While your crew rests, you take two other miners with you to the cache and get enough units for everyone. When you come back to your crew with additional SCSRs, you notice that one of the remaining six miners has taken his mouthpiece out completely and two others are cheating by breathing around it to get air. What should you do now? (Select as MANY as you think are correct.)

- 33. Motion for the miners to put their mouthpieces back in and try to breathe through them.
- 34. Motion for everyone to take off their SCSR and don one of the units you brought from the cache.
- 35. Signal for everyone to take another SCSR and to follow you down the return escapeway.
- 36. Since you and your crew are having trouble breathing from the SCSR, have everyone don a unit from the cache and then wait with you by the mandoor until help arrives.

When you have made your selection(s) do the next question.

## **Question I**

The miners put their mouthpieces back in and you continue to lead your crew down the escapeway. You check the time and find that you and your crew have now been under apparatus about 45 minutes. You travel another 5 crosscuts (visibility is still poor) when a miner takes his mouthpiece out and says "I can't get anything from this SCSR. It's like breathing through a straw with the end pinched shut!" What should you do now? (Choose only ONE unless told to "Try Again!".)

37. Stop with your crew and motion for everyone to take off their SCSR and don the one they are carrying.
38. While the others in your crew continue on, stay back with this miner and help him don his new SCSR.
39. Since the smoke is still not as thick in the return, allow this miner to go without an SCSR so that he can save the one he is carrying in case you get into heavier smoke.
40. Motion for this miner to put his mouthpiece back in and not talk.

The miner who reported that his SCSR felt like trying to breath through a straw with the end pinched shut has probably exhausted his unit. At this time, you and your crew have been under apparatus for over 50 minutes. Since one person needs to change devices, everyone on the crew should do the same at this time since the hour is just about over, and so that the group can stay together. After donning the second SCSR and checking each other to make sure everyone has the unit on properly, you and your crew continue your evacuation.

### **End of Problem**

#### **Scoring your performance**

1. Count the total number of responses you colored in that were marked "correct". Write this number on the first line on the answer sheet.
2. Count the total number of incorrect responses you colored in. Subtract this number from 24. Write the difference on the second line on the answer sheet.
3. The best score is 40. The worst score is 0.