

Problem on Dragline 1 Exercise

Instructor's Copy

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¹ This exercise was developed and field tested under U. S. Bureau of Mines research contract no. H0348040. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies or recommendations of the Interior Department's Bureau of Mines or the U. S. Government.

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Appendices

Appendix A: Problem booklet (duplicate this copy for use in class)

Appendix B: Answer sheet blank (print the answers on this)

Appendix C: Invisible ink answers (print these on the answer sheet blanks)

Introduction

This document, contains most of the materials needed to use the exercise. The main part of the document is the instructor's copy. It tells how to use the exercise, presents the objectives, the master answer sheet, the scoring key, and discussion notes to be used following the exercise. The last part of this document is three appendices. Appendix A is the exercise problem booklet. This booklet can be duplicated locally. The booklets are reusable. One is needed for every person in the classroom. Appendix B is the answer sheet. Copies of this answer sheet must have the invisible ink answers that appear in Appendix C printed on them². Answer sheets are consumable. One is needed for each person or each small group of persons who work the exercise.

Exercise Summary

Read this section first. It determines if the exercise is appropriate for your classes. If you choose to use the exercise, examine the table of contents and review the remainder of this document.

<u>Type:</u>	Invisible ink
<u>Audience:</u>	Surface miners (coal, metal and non-metal, sand, gravel, and limestone)
<u>Length:</u>	Seven questions (20 minutes administration plus discussion)
<u>Skills:</u>	Electrical safety procedures for cable splicing First aid for electrical accident victims
<u>Location:</u>	Surface mine pit
<u>Problem:</u>	You are the operator of Dragline #1. The dragline has been losing power. After making some checks, you report damage to the trailing cable about 100 feet from the machine. An electrician, "Mr. Spock", and his helper; Joe, come to troubleshoot. They determine that the cable needs to be repaired. It was damaged by a bulldozer working in the area. Spock is in a hurry. He engages in unsafe work practices. You try to stop him, but he ignores you. Soon there is an accident involving electrical shock. You must figure out how to rescue Spock without electrocuting yourself and then provide first aid to save his life.

² You can do this yourself if you have the proper equipment, or you may obtain copies of preprinted answer sheets from MSHA, National Mine Health & Safety Academy, Dept. of Instructional Materials, 1301 Airport Road, Beaver, WV 25813-9426 phone 304-256-3257, fax 304-256-3368 or email to lord-mary@msha.gov.

How to Use This Exercise

1. Look at the performance objectives. Decide if the exercise is relevant for your mine training class.
2. Work through the exercise with the developing pen and score your responses.
3. Read the master answer sheet for the exercise. Look at all the answers.
4. Read the "Instructor's Discussion Notes" for the exercise.
5. Become thoroughly familiar with the problem so that you can present it to your class without reading it. Put the map on an overhead projector so you can use it to help explain the problem.
6. When you present the exercise to the class:
 - Give each person an exercise booklet, and each group of 3 to 5 persons one answer sheet, and a developing pen.
 - Demonstrate how to select and mark answers using the developing pen.
 - Go over the instructions for doing the exercise with the whole group.
 - Explain the problem making sure everyone understands the problem situation.
 - Have the class members work the exercise.
 - When the class members finish, have them figure up their score using the instructions at the end of the exercise.
 - When everyone has finished, encourage class members to discuss the merits of each answer. Add your own ideas.

Performance Objectives for Problem on Dragline 1

Objective number	Capability verb(s)	Description of required performance and conditions under which it is to occur
1. EL ³	Predict Anticipate	The occurrence and likely effects of an impending electrical accident given a description of the electrician's actions and a sequence of local events.
2. EL	Recall Identify	Proper sequence of actions for repair of electrical equipment; including the locking out and tagging of equipment by the person doing the repairs
3. EL	Recognize Identify Evaluate	Positions and actions that place self and others at risk when working with or around electrical equipment
4. EL/FA	Recognize Identify Judge	Actions that can lessen or worsen the progression of an electrical accident and the injuries to victim(s)
5. EL/FA	Identify Anticipate Evaluate	The probable effects and consequences of actions intended to free a victim from contact with a live electrical cable
6. EL/FA	Order Arrange	A sequence of actions to remove a victim from contact with a live electrical cable while minimizing further injury to the victim and the rescuer(s)
7. FA	Recall Select	Procedures for conducting a primary and secondary survey
8. FA	Recognize Select Order	Proper procedures for performing artificial reaperation, diagnosing and treating shock; and treating electrical burns
9. FA	Recognize Evaluate Select	Actions and statements that appropriately direct the efforts of other miners in assisting first aider(s) in caring caring for a victim and communicating to others a description of the accident

³ Skill and knowledge domain abbreviations:

EL = electrical

FA = first aid

Master Answer Sheet for Problem on Dragline 1

Use this answer sheet to mark your selections. Rub the developing pen gently and smoothly between the brackets. Don't scrub the pen or the message may blur. Be sure to color in the entire message once you have made a selection. Otherwise, you may not get the information you need.

Question A (Choose only ONE unless you are told to "Try Again!")

1. [The cable and ground are wet, but if all safety precautions are taken this will]
[not create a problem. Try again!]
2. [The damage is 100 feet from the machine. The exact location is not]
[important. Try again!]
3. [This should have been done before going out on any job. Joe can work only]
[under the supervision of a qualified electrician. Try again!]
4. [Equipment should be inspected before going out on the job. All their]
[equipment is in good condition. Both are wearing rubber boots and carrying]
[hot gloves. Try again!]
5. [Correct. The other things listed are important, but checking for power on the]
[cable is the most important step. The cable must be de-energized before]
[work begins. Do the next question.]

Question B (Choose only ONE unless you are told to "Try Again!")

6. [This is a potentially dangerous situation. Your failure to act could contribute]
[to an accident. Try again!]
7. [Correct. But Spock tells you it's none of your business and sends Joe on.]
[Do the next question.]
8. [You need to stay. Spock is acting carelessly. If he starts to fix the cable]
[before it is disconnected, he could be killed. Try again!]
9. [You are not the person who should de-energize the circuit. Try again!]

Question C (Choose only ONE unless you are told to "Try Again!")

10. [Joe says it was probably Hulk, and that Spock will have already spliced the cable by the time Hulk puts the power on. Try again!]
11. [Spock is running the risk of cutting into a live cable. Try again!]
12. [Correct. But when you suggest this, he says not to worry about it and lays out his tools and splice kit. Do the next question.]
13. [You are not the person who should check to see if the circuit is de-energized. Try again!]

Question D (Choose only ONE unless you are told to "Try Again!")

14. [This is not a positive test. The dragline might not operate, but the cable could still be energized. Try again!]
15. [He could be cutting into a live cable and exposing himself to shock. Try again!]
16. [Using a voltmeter on high voltage is very dangerous and could cause injury. Try again!]
17. [Correct. The only safe way to proceed is for Spock to trace the cable to the disconnects and to add his lock. Do the next question.]

Question E (Choose only ONE unless you are told to "Try Again!")

18. [This would take too long. Spock needs help right now. Try again!]
19. [You have no gloves. The cable is wet. You are knocked down by a strong shock that takes your breath away. Try again!]
20. [Correct. Spock needs to be moved as soon as possible, but without putting yourself in danger. Do the next question.]
21. [The 2" x 4" you find is damp. When you touch Spock with it, you get a strong shock that takes your breath away. Try again!]

Question F (Choose only ONE unless you are told to "Try Again!")

22. [This wastes time. Spock needs first aid now. Try again!]
23. [It is important to treat Spock for shock, but you should do something else first.]
[Try again!]
24. [This would take too long. Spock needs first aid immediately. Try again!]
25. [Burns should be checked and treated, but you should do something else first.]
[Try again!]
26. [Correct. Spock is not breathing, but you find a slow, weak pulse. You start]
[artificial respiration. Do the next question.]

Question G (Choose only ONE unless you are told to "Try Again!")

27. [You need Joe's help. Try again!]
28. [The power should be cut, but Joe should do something else first. Try again!]
29. [Correct. You need to stay with Spock, but it is important to get medical help]
[for him right away. END OF PROBLEM.]
30. [The accident should be reported to a supervisor, but Joe should do]
[something else first. Try again!]

Finding your score

Number of "Correct" answers you colored in = (1)_____

23 minus number of incorrect answers you colored in = (2)_____

Add the numbers in blanks one and two to get your total score = (3)_____

Highest possible score = 30

Lowest possible score = 0

Discussion Notes for Problem on Dragline 1 Exercise

Use the information presented here and on the master answer sheet, your own ideas and experience, and that of the miners in your class to discuss the exercise after it is completed. Group discussion can help strengthen knowledge and skills, correct errors, and relate the exercise content to the experiences of the miners. After they have worked the exercise; miners enjoy discussing the problem. They also frequently think of better ways to respond to a problem than those listed among the answers. The purpose of the exercise is to help miners think about and remember basic knowledge and skills they may someday need to deal with a mine emergency. The discussion following the exercise can contribute to this goal and tailor the exercise content to the needs of the group you are training.

It is helpful to show overhead transparencies of the answers on the master answer sheet during the discussion, while the miners look at their problem booklets. This allows you to lead the group through the exercise and to discuss all the answers to each question; Most of the information about why particular answers are correct or incorrect is given on the master answer sheet.

The following notes provide additional information for you to discuss with your class. Read through and think about the notes before the class. Incorporate the ideas you find here with your own ideas and make these points at the appropriate place in the discussion of the exercise.

Question A - The correct answer is 5. Before any work proceeds, the electrician working on the cable should ensure that the cable is properly de-energized. Checking and wearing personal protective equipment to protect from shock (4) is appropriate, but is of a substitute for de-energizing the cable. Although the area is wet (1), proper precautions can prevent this from being a problem. Spock is a qualified electrician. According to 30 CFR §77.501, Joe is also qualified to do electrical repairs (3), but only under the direct supervision of Spock. All of the items listed could contribute to an electrical accident but the possible failure of the electrician to de-energize, lock out, and tag the circuit before beginning electrical repairs (5), poses the greatest threat.

Question B -The correct answer is 7. Intervention at this point could prevent an accident. Reminding Spock that he, not Joe, should disconnect, lock out, and tag the power source for the cable, is an attempt to have him comply with 30 CFR §77.500 and avoid the hazards of inadvertently cutting into an energized cable. Both (8) and (9) leave the task of de-energizing the circuit to someone other than the person making the repairs. Discuss the responsibility that the person de-energizing a circuit for someone else is assuming, and the problems that can arise.

Question C - The correct answer is 12. Sending a third party to check to see whether the cable has been properly disconnected (13), failing to add a second tag and lock out the disconnects (10), or splicing the cable without any further attempt to establish whether the cable is de-energized (11), all can have deadly consequences. At this point, Spock shows little concern for the possible hazard but your suggestion that he add his lock to the disconnect (12), could prevent the accident.

Question D - The correct answer is 17, remembering that the cable may be re-energized at any moment at the disconnects by the person who initially disconnected the cable. If proper lockout and tag procedures had been followed, the circuit would be safe to work on. Checking to see if the dragline will operate is a substitute for locking out and tagging the disconnects. The operator can tell if the power is still on his machine, although it is possible for one phase to be energized which would render the machine inoperative but the cable would still be hot. Using a voltmeter (16) on high voltage is not safe since meters seldom have a scale for such high voltage and generally are not in good enough repair to be safe for such high voltages. Cutting into the cable (15) without first tracing the cable to the substation and locking and tagging the disconnects is very dangerous. This short cut has caused hundreds of fatalities and injuries over the years.

Question E - The correct answer is 20. Your first concern is to remove Spock from the cable without endangering yourself. The disconnect (19) is 1500 feet away. By the time you disconnected the power, Spock would be dead. A timber from a wet mine (21) could be an excellent conductor of electricity, further endangering the rescuer. While it may be possible to pull the cable away from Spock (19), the cable should not be handled near the damage, especially when it is wet. The rescuer should also check for water on the ground before going close to Spock. Damp clothes will also conduct electricity. Using a hot stick and gloves would be a safe way to move Spock away from the cable (20)

Question F - The correct answer is 26. A primary survey should be conducted to check Spock for injuries. Although burns (25) and shock (23) are legitimate concerns, the first priority is to check for breathing. Electrical shock victims often suffer from respiratory arrest and require artificial respiration and possibly CPR to re-establish breathing and heart beat. Cutting the power at the disconnect (22) is no longer immediately necessary since Spock has been removed from direct contact with the energized cable. Using the radio to call for help (24), must wait until Spock's breathing and circulation have been checked. Restoring his breathing and circulation must take priority over leaving to get help even for a few moments. Ask the members of the class why this is so. (Answer: Permanent brain and other organ damage and/or death can result from the absence of breathing and circulation for only a few minutes. A few critical minutes have already been used up while you removed him from the energized cable.)

Question G - The correct answer is 29. Once Spock's breathing has been re-established and he is being treated for shock and burns, outside help should be sought. Again, going to cut the power (28) wastes time since Spock is no longer in danger of receiving further electrical shocks. Looking for a supervisor to report the accident (30), unnecessarily delays seeking professional medical assistance. Spock's condition, his location, and what has happened to him, should be reported to the local EMS service as soon as possible. Blaming Joe for the accident (27), is inappropriate and also wastes time in notifying medical personnel. In addition, Joe's reaction to the incident should not be ignored.

Witnesses to accidents often suffer from confusion and poor judgment. In this case, Joe is likely to blame himself for the injury to Spock, further increasing his chances

of being upset, not thinking clearly, and perhaps doing something stupid. If you suspect Joe is not functioning well, how would this change the situation?

References

- American Red Cross. (1981). Standard first aid & personal safety (2nd ed.). New York: Doubleday.
- Aaron, J. E., Bridges; F. A., & Ritzel, D. O. (1972). First aid and emergency care: Prevention and protection of injuries. New York: Macmillan.
- Bergeron, J. D. (1982). First responder. Bowie, MD: Robert J. Brady Co.
- Collins, T., Gover, N., Clingan, M., Smith, M.; Pekluchetter, R. C., & Klishis, M. 1984). Common sense electrics, safety (Electrical hazards Reference text). Morgantown, WV: West Virginia University, Mining Extension Service.
- Darling, K. (1985). First aid and emergency medical care. In F. Cameron (Ed.), The Kentucky underground coal mining book. Lexington, KY: The Kentucky Mining Institute.
- Mine Safety Associates. (1985). Federal coal mine safety stand 30 CFR 75: Pocket edition. Price, UT: Author.
- Mine Safety and Health Administration. (1980). First aid book. Washington, DC: U. S. Government Printing Office.
- Mining Enforcement and Safety Administration. (1975). Electrical hazards in underground coal mining (film). Beckley, WV: National Mine Health and Safety Academy.
- National Mine Health and Safety Academy. (undated). Electrical hazards (Safety Manual No. 9). Beckley; WV: Author.
- Office of the Federal Register. (1984). Code of federal regulations: 30. (parts 0 to 199). Washington, DC: U. S. Government Printing Office.

Scoring Key for Problem on Dragline 1

The correct answers are marked with an asterisk.⁴

Question	Answer Number				
A	1	2	3	4	5*
B	6	7*	8	9	
C	10	11	12*	13	
D	14	15	16	17*	
E	18	19	20*	21	
F	22	23	24	25	26*
G	27	28	29*	30	

⁴ This page is printed in large type so that it may be copied and used as an overhead transparency.

Appendix A: Problem Booklet

Duplicate this copy of the problem booklet for use in your classes. **Booklets should be printed on only one side of the paper.** Each person in your class should have a problem booklet while they are working the exercise. The problem booklets are reusable.

You may obtain a copy of the problem booklet from MSHA, National Mine Health & Safety Academy, Dept. of Instructional Materials, 1301 Airport Road, Beaver, WV 25813-9426 phone 304-256-3257, fax 304-256-3368 or email to lord-mary@msha.gov.

Problem on Dragline 1

Problem Booklet

Instructions

Read the problem situation described on the next page. Then study Figure 1. Next answer each of the 7 questions. Do them one at a time. Don't jump ahead but you may look back to earlier questions and your answers.

After you have selected a choice to a question look up the number for that choice on the answer sheet. Select your answer to the questions by rubbing the developing pen between the brackets on the answer sheet. A hidden message will appear and tell you if you are right or wrong and why. The best score is obtained by selecting the one correct answer for each question. However, if you select a wrong answer, try again. This will help you learn the correct answer to each question. When you finish you will learn how to score your performance.

Background

You are the operator of Dragline #1 at a surface mine.

Spock is a qualified mine electrician.

Joe is an electrician but new to this mine. He can do electrical work only under the supervision of Spock.

Both Spock and Joe have rubber boots on and both have rubber "hot" gloves, and a "hot" stick with them.

Both have the usual electricians' tools including tags and locks.

All their equipment is in good condition.

It has been raining. The mine site is wet.

Spock's utility truck is equipped with a two way radio.

Dragline #1 is operated by an electrical cable with 7,200 volts.

The cable electrical power disconnects are 1500 feet from the dragline.

Problem

Dragline #1 has been losing power. After making some checks, you report damage to the trailing cable. The damage is about 100 feet from the machine. You are waiting for the cable to be repaired by a qualified electrician. An electrician, Spock, and his helper, Joe, come to troubleshoot. They determine that the cable is in need of repair. It was damaged by a bulldozer working in the area.

Study the map on the next page. Then turn the page and answer the first question.

disconnects at power line poles
(1500 ft. from dragline)

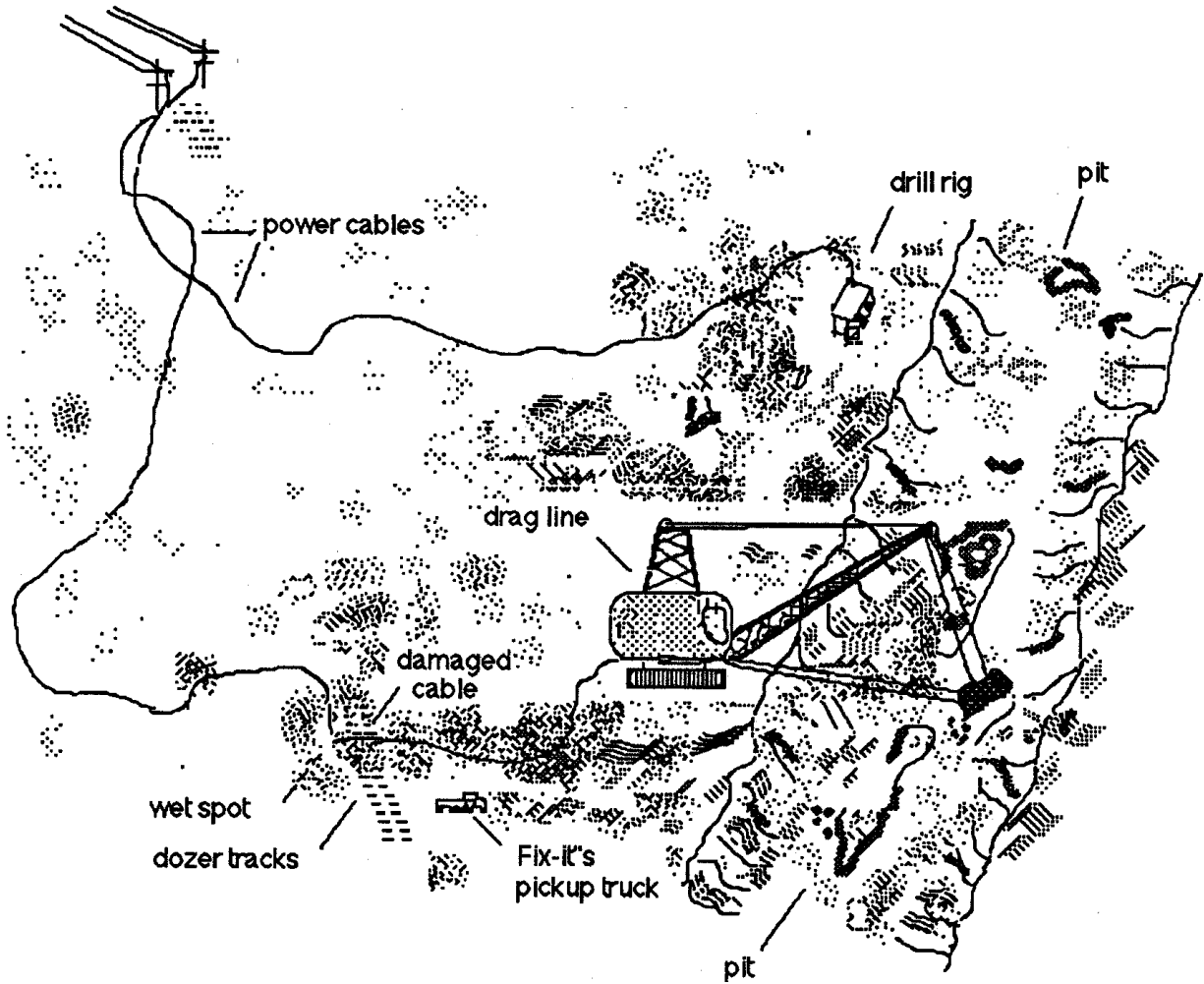


Figure 1: Position of equipment at the surface mine (not to scale)

Question A

What is the first thing that Spock should check before making the splice in the cable?
(Choose only ONE unless you are told to "Try again!")

1. Water in the area
2. Exact location of the splice
3. Joe's qualifications to do electrical work
4. Personal protective equipment
5. Power on the cable

Question B

Spock decides to splice the cable. He sends Joe to cut the power. What should you do? (Choose only ONE unless you are told to "Try again!")

6. Nothing, it isn't your job.
7. Tell Spock that he should trace the cable back, lock it out, and tag it himself.
8. Go with Joe to be sure that he disconnects the correct cable.
9. Offer to do it yourself. It's your machine and you're just standing around anyway.

Question C

Joe returns and tells Spock that the cable had already been disconnected when he got to the disconnects. What should Spock do now? (Choose only ONE unless you are told to "Try again!")

10. Send Joe to find out who pulled the disconnects.
11. Go ahead and splice the cable.
12. Go to the disconnects and add his lock.
13. Send you to the disconnects to see if the cable is disconnected properly.

Question D

Spock accepts Joe's word that the disconnects are pulled on the proper cable. What is the first thing Spock should do now? (Choose only ONE unless you are told to "Try again!")

14. Ask you (the operator) to check to see if there is power to the dragline.
15. Go ahead and cut into the cable to make the splice.
16. Send Joe to the truck for a voltage tester.
17. Remember that someone else pulled the disconnects, and that this same person could re-energize the circuit at anytime.

Question E

Spock is in a hurry to finish this job. His hot stick and rubber gloves are in his pickup truck. Before you can do anything, Spock drops to his knees and cuts into the cable. He immediately jerks and then slumps to the ground, with his arms and upper body across the cable. Joe immediately runs off yelling that Spock is hurt. Joe's rubber gloves are on his belt. You yell to Joe to come back, but he keeps going. What is the first thing you should do? (Choose only ONE unless you are told to "Try again!")

18. Take the pickup truck and go cut the power at the disconnects.
19. Immediately grab the cable and pull it away from Spock.
20. Grab a hot stick and Spock's gloves from the truck and use them to move him away from the cable.
21. Look around for a timber or a board and use it to push Spock away from the cable.

Question F

Using the hot stick and rubber gloves you are able to move Spock about 5 feet from the cable. Then, using the gloves you drag him another 20 feet away from the cable. When you kneel by him you find there is no stray current. Now, what is the first thing you should do? (Choose only ONE unless you are told to "Try again!")

22. Jump in the pickup truck and go cut the power at the disconnects.
23. Cover Spock with a coat to keep him warm.
24. Use the pickup truck radio to call for help.
25. Check Spock's hands and arms for burns.
26. Check Spock's breathing.

Question G

You administer a few breaths mouth to mouth. Soon Spock starts breathing again. As you examine Spock for other injuries, you find he is in shock and has serious electrical burns on his hands and arms. Then Joe comes back. What is the first thing you should tell him to do? (Choose only ONE unless you are told to "Try again!")

- 27. "Stay out of the way! You've caused enough trouble!"
- 28. "Go and cut the power!"
- 29. "Go to the pickup truck and radio for help!"
- 30. "Go and find a supervisor to report the accident!"

END OF PROBLEM

Scoring your performance

1. Count the total number of responses you colored in that were marked "correct". Write this number in the first blank on the answer sheet.
2. Count the total number of "incorrect" responses you colored in. Subtract this number from 23. Write the difference in the second blank on the answer sheet.
3. To find your score, add the numbers in blanks one and two.

The best possible score is 30.

The worst possible score is 0.

Appendix B: Answer Sheet Blanks

These are the answer sheet blanks. Copies of these blank answer sheets may be duplicated in the normal fashion. However, the answers that are found within the brackets must be printed on these blank answer sheets in invisible ink. These answers are found in Appendix C. If you have the capability to print invisible ink, make copies of the blank answer sheets. Make a master of the answers that appear in Appendix C. Then print the invisible ink on the blank answer sheets, being careful to make sure all pages print and that the appropriate answers line up with the appropriate blanks. The Master Answer Sheet shows all the answers in their proper places.

Most companies and trainers prefer to obtain copies of the preprinted answer sheets from MSHA, National Mine Health & Safety Academy, Dept. of Instructional Materials, 1301 Airport Road, Beaver, WV 25813-9426 phone 304-256-3257, fax 304-256-3368 or email to lord-mary@msha.gov.

The exercise is designed to be used in small groups. You will need one answer sheet for each group of 3 to 5 persons in your class. The answer sheets are consumable. You will need a new set for each class.

A developing pen is also needed by each person who marks an answer sheet.

Answer Sheet for Problem on Dragline 1

Use this answer sheet to mark your selections. Rub the developing pen gently and smoothly between the brackets. Don't scrub the pen or the message may blur. Be sure to color in the entire message once you have made a selection. Otherwise, you may not get the information you need.

Question A (Choose only ONE unless you are told to "Try Again!")

1. []
[]
2. []
[]
3. []
[]
4. []
[]
[]
5. []
[]
[]

Question B (Choose only ONE unless you are told to "Try Again!")

6. []
[]
7. []
[]
8. []
[]
9. []

Question C (Choose only ONE unless you are told to "Try Again!")

10. []
[]

11. []

12. []
[]

13. []
[]

Question D (Choose only ONE unless you are told to "Try Again!")

14. []
[]

15. []

16. []
[]

17. []
[]

Question E (Choose only ONE unless you are told to "Try Again!")

18. []

19. []
[]

20. []
[]

21. []
[]

Question F (Choose only ONE unless you are told to "Try Again!")

22. []

23. []
[]

24. []

25. []
[]

26. []
[]

Question G (Choose only ONE unless you are told to "Try Again!")

27. []

28. []

29. []
[]

30. []
[]

Finding your score

Number of "Correct" answers you colored in = (1)_____

23 minus number of incorrect answers you colored in = (2)_____

Add the numbers in blanks one and two to get your total score = (3)_____

Highest possible score = 30

Lowest possible score = 0

Appendix C: Invisible ink Answers

These pages contain the answers that must be printed in the blanks of the answer sheet in Appendix B. These answers are spaced and sequenced correctly so that they exactly match up with the appropriate blanks on the answer sheet blank.

Once the answers have been printed in the answer sheet blanks, the developing pen reveals the formerly invisible printed message.

You may obtain preprinted answer sheets or you may prepare your own copies. To learn more about these options, and to determine how many answer sheets and developing pens you will need, see the introductory section of the Instructor's Copy.

The cable and ground are wet, but if all safety precautions are taken this will not create a problem. Try again!

The damage is 100 feet from the machine. The exact location is not important. Try again!

This should have been done before going out on any job. Joe can work only under the supervision of a qualified electrician. Try again!

Equipment should be inspected before going out on the job. All their equipment is in good condition. Both are wearing rubber boots and carrying hot gloves. Try again!

Correct. The other things listed are important, but checking for power on the cable is the most important step. The cable must be de-energized before work begins. Do the next question.

This is a potentially dangerous situation. Your failure to act could contribute to an accident. Try again!

Correct. But Spock tells you it's none of your business and sends Joe on. Do the next question.

You need to stay. Spock is acting carelessly. If he starts to fix the cable before it is disconnected, he could be killed. Try again!

You are not the person who should de-energize the circuit. Try again!

Joe says it was probably Hulk, and that Spock will have already spliced the cable by the time Hulk puts the power on. Try again!

Spock is running the risk of cutting into a live cable. Try again!

Correct. But when you suggest this, he says not to worry about it and lays out his tools and splice kit. Do the next question.

You are not the person who should check to see if the circuit is de-energized. Try again!

This is not a positive test. The dragline might not operate, but the cable could still be energized. Try again!

He could be cutting into a live cable and exposing himself to shock. Try again!

Using a voltmeter on high voltage is very dangerous and could cause injury. Try again!

Correct. The only safe way to proceed is for Spock to trace the cable to the disconnects and to add his lock. Do the next question.

This would take too long. Spock needs help right now. Try again!

You have no gloves. The cable is wet. You are knocked down by a strong shock that takes your breath away. Try again!

Correct. Spock needs to be moved as soon as possible, but without putting yourself in danger. Do the next question.

The 2" x 4" you find is damp. When you touch Spock with it, you get a strong shock that takes your breath away. Try again!

This wastes time. Spock needs first aid now. Try again!

It is important to treat Spock for shock, but you should do something else first. Try again!

This would take too long. Spock needs first aid immediately. Try again!

Burns should be checked and treated, but you should do something else first. Try again!

Correct. Spock is not breathing, but you find a slow, weak pulse. You start artificial respiration. Do the next question.

You need Joe's help. Try again!

The power should be cut, but Joe should do something else first. Try again!

Correct. You need to stay with Spock, but it is important to get medical help for him right away. END OF PROBLEM.

The accident should be reported to a supervisor, but Joe should do something else first. Try again!