

APPENDIX J:  
VEST USABILITY QUESTIONNAIRE

Mining Vest Usability Questionnaire

Vest ID #:

Date:

## INITIAL VISIT QUESTIONNAIRE

### DEMOGRAPHICS

Age: \_\_\_\_\_ Years

Gender (circle one):      Male                  Female

Height: \_\_\_\_\_ Feet \_\_\_\_\_ Inches

Weight: \_\_\_\_\_ Pounds

### MINING EXPERIENCE

Current Job Title: \_\_\_\_\_

Other Job Titles: \_\_\_\_\_

Total # of Mines Worked: \_\_\_\_\_

	Years	Weeks
Experience in this Job Title		
Experience at this Mine		
Total Mining Experience		

### JOB TITLE QUESTIONS

Please answer the following questions related to your CURRENT JOB TITLE:

1. Describe the type of work you do on a typical day (What jobs/tasks are associated with your job title?):
  
  
  
  
  
  
  
  
  
  
2. Please list what items you carry on your belt, on your hard hat, or in your pockets on a regular basis. Please include manufacturer and/or model where possible:

including suggestions for reducing this burden to CDC/ATSDR Reports Clearance Officer, 1600 Clifton Road NE, MS D-74, Atlanta, Georgia 30333; ATTN: PRA (0920-XXXX).

3. Please mark on the pictures below what and where you typically wear on your belt when riding on the MANTRIP and while you are WORKING:



4. During seated tasks, such as riding on the mantrip and operating machinery, do you have any difficulty wearing any of your equipment?
- A. Yes
  - B. No

If so, which tasks and which equipment?\_

5. What percentage of your week do you spend doing the following **ACTIONS**? Circle the box that matches the percentage of time you spend in an average week performing these actions. Try to make the percentages add up to 100%.

Bending Over	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Twisting your back	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Reaching overhead	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Reaching in front of you	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Reaching to the side	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Other:	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

6. What percentage of your week do you spend in the following **POSITIONS**? Circle the box that matches the percentage of time you spend in an average week in these positions. Try to make the percentages add up to 100%.

Walking	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Standing	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Sitting	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Crouching	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Kneeling	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Crawling	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Laying Down	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

Other	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
-------	----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------

7. What is the most physically demanding part of your job?

Why?

## General Mining Vest

Several researchers want to develop a vest for mining. This vest would be similar to a tactical vest that policemen or soldiers wear to carry their gear while keeping their hands free. The mining vest would have pouches for specific tools, such as a gas meter or a radio, that could be attached anywhere. Please answer the following questions related to a mining vest IN GENERAL.

8. Do you think the idea of a mining vest is a good one?
- Yes
  - No

Why or why not?

9. Given the following choices to carry your gear, what would you choose to use most often?
- Mining Vest Only
  - Mining Belt Only
  - Mining Belt and Vest
  - Other: \_\_\_\_\_

10. If you were to wear a mining vest, which of the following items would you attach to the vest? (Mark all that apply):

- Multi-Gas Meter
- Anemometer (air flow)
- Radio
- Tracking Device
- Self-Contained Self Rescuer
- Personal Dust Monitor
- Tools (Please Specify): \_\_\_\_\_
- Other (Please Specify): \_\_\_\_\_

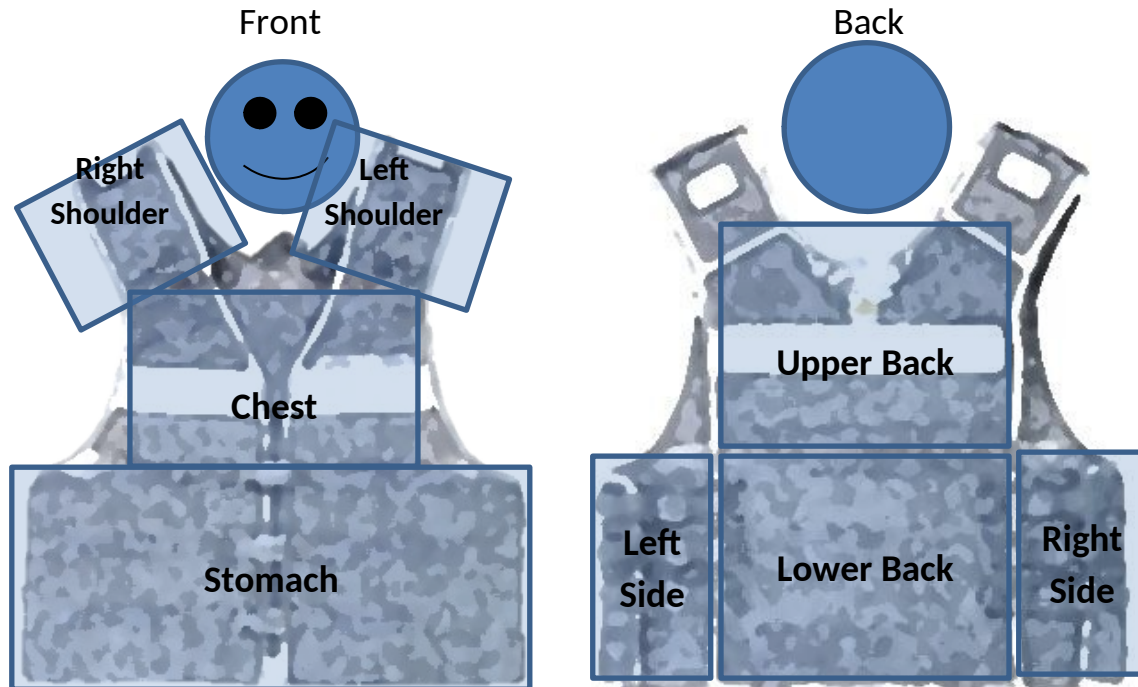
11. Have you ever regularly used at work or in your free time (i.e. fishing vest, hunting vest, life vest)?
- Yes
  - No

If so, please specify what type and how often.



12. Below is an example of a mining vest described above, where the front of the vest is on the left and the back is on the right. General regions have been added to help orient you. Please mark the following:

- (1) Mark regions or areas within a region with a 'X' where you would not want anything attached and explain why in the space below
- (2) Mark regions or areas within a region with a 'R' where rigid components could go
- (3) Mark regions or areas within a region with a 'H' where heavy components could go



Explanations for X's (Please identify x's):

13. How do you think a typical miner would clean a mining vest?

- A. Wash in the laundry
- B. Spray off with a hose
- C. Brush/shake off the dirt
- D. Probably would not clean
- E. Other: \_\_\_\_\_


14. How often do you think a typical miner would clean a mining vest?

- A. Daily
- B. Weekly
- C. Monthly
- D. Less than once a month
- E. Never

## MODIFIED ERGODYNE® MINING VEST

Please answer the following questions related SPECIFICALLY to the modified Ergodyne® vest given to you.

15. On a scale from 1 to 10, please rate the COMFORT of the modified Ergodyne® vest:



1 2 3 4 5 6 7 8 9 10


Very Poor

Neutral

Excellent

What changes should be made to the modified Ergodyne® vest to improve the COMFORT?

16. On a scale from 1 to 10, please rate the USEFULNESS the modified Ergodyne® vest:



1 2 3 4 5 6 7 8 9 10


Very Poor

Neutral

Excellent

What changes should be made to the modified Ergodyne® vest to improve the USEFULNESS?

17. On a scale from 1 to 10, please rate the modified Ergodyne® OVERALL:



1 2 3 4 5 6 7 8 9 10


Very Poor

Neutral

Excellent

What other changes should be made to the modified Ergodyne® vest to improve it OVERALL?

18. What is the likelihood that you would wear the modified Ergodyne vest consistently day in and day out (would wear it at all):




1 2 3 4 5 6 7 8 9 10

Very Unlikely

Neutral

Very Likely

19. What is the likelihood that you would wear the modified Ergodyne vest for the majority of a shift underground (would keep it on):




1 2 3 4 5 6 7 8 9 10

Very Unlikely

Neutral

Very Likely

20. What is the likelihood that you would recommend the modified Ergodyne vest to other miners that you work with:




1 2 3 4 5 6 7 8 9 10

Very Unlikely

Neutral

Very Likely

21. What is the likelihood that the modified Ergodyne vest would make your job easier:



1 2 3 4 5 6 7 8 9 10

Very Unlikely

Neutral

Very Likely

## VEST-STYLE SELF-CONTAINED SELF-RESCUER (SCSR)

Some researchers also want to improve the self-rescuer. One option is to make the self-rescuer into a vest. Imagine all parts of an SCSR (oxygen, breathing bag, carbon dioxide scrubber, etc.) being sewn into a vest instead of being worn on the belt like the CSE SR-100 or Ocenco M20. This idea is similar to the “smart shirts” worn by football players and other athletes, where the technology is actually a part of the shirt. Please answer the following questions related to a vest-style SCSR described above:



22. Would you prefer to wear a vest-style SCSR or a belt-worn unit (Like CSE SR-100 or SRLD)?

- A. Vest SCSR
- B. Belt worn unit

23. If a 1-hour self-contained self-rescuer (SCSR) was available built into a vest would you consider wearing it?

- A. Yes
- B. No

If not, please explain:

24. How would you prefer to use a 1-hour vest-style SCSR?

- A. Worn only
- B. In storage location only
- C. Placed nearby only
- D. All of the above
- E. Other (specify): \_\_\_\_\_

25. If a 10-minute self-contained self-rescuer (SCSR) was available built into a vest would you consider wearing it?

- A. Yes
- B. No

If not, please explain:

26. How would you prefer to use a 10-minute vest-style SCSR?

- A. Worn only
- B. In storage location only
- C. Placed nearby only
- D. All of the above
- E. Other (specify): \_\_\_\_\_

27. What functionality, other than acting as an SCSR, would you expect from a vest-style SCSR (i.e. pouches to carry other equipment, hydration pouch, etc.)?

# FINAL VISIT QUESTIONNAIRE

## MINING EXPERIENCE

Current Job Title: _____	Years	Weeks
Total # of Mines Worked: _____	Experience in this Job Title	
	Total Mining Experience	

## JOB TITLE QUESTIONS

Please answer the following questions related to your CURRENT JOB TITLE:

1. What percentage of your week do you spend doing the following **ACTIONS**? Circle the box that matches the percentage of time you spend in an average week performing these actions. Try to make the percentages add up to 100%.

Bending Over	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Twisting your back	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Reaching overhead	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Reaching in front of you	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Reaching to the side	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Other:	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

2. What percentage of your week do you spend in the following **POSITIONS**? Circle the box that matches the percentage of time you spend in an average week in these positions. Try to make the percentages add up to 100%.

Walking	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Standing	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Sitting	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Crouching	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Kneeling	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Crawling	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Laying Down	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Other	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

3. Now that you have worn a mining vest, did wearing a mining vest change how you did your job? Why and how?

4. Now that you have worn a mining vest, did any of the items you carry underground change?
  - A. Yes
  - B. No

Do you carry more or less?

- A. More
- B. Less
- C. About the Same

Please list the items you could not carry as well as the new ones you were able to carry while wearing the vest.

5. During seated tasks, such as riding on the mantrip and operating machinery, do you have any difficulty wearing any of your equipment?
- C. Yes
  - D. No

If so, which tasks and which equipment?\_

Did the vest improve any of these problems or make them worse?

Were there any other problems caused by the vest?

## GENERAL MINING VEST

Several researchers want to develop a vest for mining. This vest would be similar to a tactical vest that policemen or soldiers wear to carry their gear while keeping their hands free. The mining vest would have pouches for specific tools, such as a gas meter or a radio, that could be attached anywhere. Please answer the following questions related to a mining vest IN GENERAL.

6. Now that you have worn a mining vest, do you think the idea of a mining vest IN GENERAL is a good one?
- A. Yes
  - B. No

Why or why not?

7. Now that you have worn a mining vest, given the following choices to carry your gear, what would you choose to use most often?

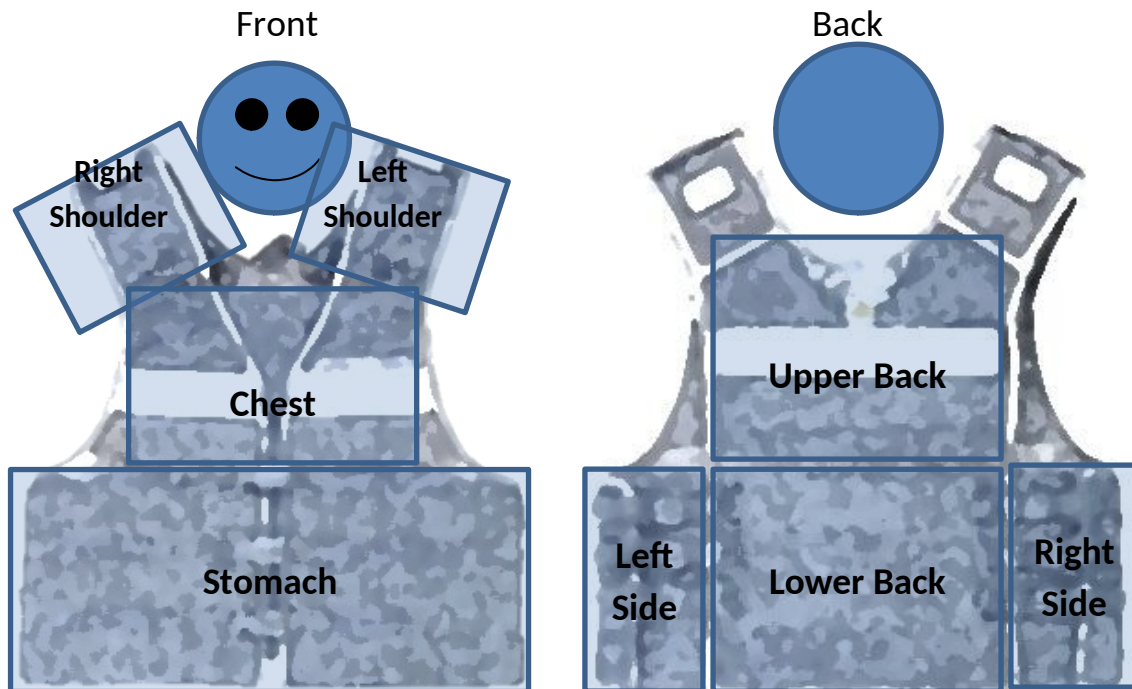
- E. Mining Vest Only (not necessarily the Ergodyne vest)
- F. Mining Belt Only
- G. Mining Belt and Vest
- H. Other: \_\_\_\_\_

8. Now that you have worn a mining vest, if you were to wear a mining vest (not necessarily the Ergodyne vest), which of the following items would you attach to the vest? (Mark all that apply):

- Multi-Gas Meter
- Anemometer (air flow)
- Radio
- Tracking Device
- Self-Contained Self Rescuer
- Personal Dust Monitor
- Tools (Please Specify): \_\_\_\_\_
- Other (Please Specify): \_\_\_\_\_

9. Below is an example of a mining vest described above, where the front of the vest is on the left and the back is on the right. General regions have been added to help orient you. Please the mark the following:

- (4) Mark regions or areas within a region with a 'X' where you would not want anything attached and explain why in the space below
- (5) Mark regions or areas within a region with a 'R' where rigid components could go
- (6) Mark regions or areas within a region with a 'H' where heavy components could go



Explanations for X's (Please identify x's):

10. Now that you have worn a mining vest, how do you think a typical miner would clean a mining vest?

- F. Wash in the laundry
- G. Spray off with a hose
- H. Brush/shake off the dirt
- I. Probably would not clean
- J. Other: \_\_\_\_\_

11. Now that you have worn a mining vest, how often do you think a typical miner would clean a mining vest?

- F. Daily
- G. Weekly
- H. Monthly
- I. Less than once a month
- J. Never

## MODIFIED ERGODYNE® MINING VEST

Please answer the following questions related SPECIFICALLY to the modified Ergodyne® vest given to you.

12. On a scale from 1 to 10, please rate the COMFORT of the modified Ergodyne® vest:

1	2	3	4	5	6	7	8	9	10
Very Poor				Neutral					Excellent

What changes should be made to the modified Ergodyne® vest to improve the COMFORT?

13. On a scale from 1 to 10, please rate the USEFULNESS the modified Ergodyne® vest:

1	2	3	4	5	6	7	8	9	10
Very Poor				Neutral					Excellent

What changes should be made to the modified Ergodyne® vest to improve the USEFULNESS?

14. On a scale from 1 to 10, please rate the modified Ergodyne® OVERALL:

1	2	3	4	5	6	7	8	9	10
Very Poor				Neutral					Excellent

What other changes should be made to the modified Ergodyne® vest to improve it OVERALL?

15. What is the likelihood that you would wear the modified Ergodyne vest consistently day in and day out (would wear it at all):

1	2	3	4	5	6	7	8	9	10
Very Unlikely				Neutral					Very Likely

16. What is the likelihood that you would wear the modified Ergodyne vest for the majority of a shift underground (would keep it on):

1	2	3	4	5	6	7	8	9	10
Very Unlikely				Neutral					Very Likely

17. What is the likelihood that you would recommend the modified Ergodyne vest to other miners that you work with:

1	2	3	4	5	6	7	8	9	10
Very Unlikely				Neutral					Very Likely

18. What is the likelihood that the modified Ergodyne vest would make your job easier:

A horizontal Likert scale consisting of 10 equally spaced vertical tick marks. Below each tick mark is a corresponding number from 1 to 10, starting from the left and ending on the right.

Very Unlikely

Neutral

Very Likely

## VEST-STYLE SELF-CONTAINED SELF-RESCUER (SCSR)

Some researchers also want to improve the self-rescuer. One option is to make the self-rescuer into a vest. Imagine all parts of an SCSR (oxygen, breathing bag, carbon dioxide scrubber, etc.) being sewn into a vest instead of being worn on the belt like the CSE SR-100 or Ocenco M20. This idea is similar to the “smart shirts” worn by football players and other athletes, where the technology is actually a part of the shirt. Please answer the following questions related to a vest-style SCSR described above:

19. Would you prefer to wear a vest-style SCSR or a belt-worn unit (Like CSE SR-100 or SRLD)?
- C. Vest SCSR
  - D. Belt worn unit

20. If a 1-hour self-contained self-rescuer (SCSR) was available built into a vest would you consider wearing it?
- C. Yes
  - D. No

If not, please explain:

21. How would you prefer to use a 1-hour vest-style SCSR?
- F. Worn only
  - G. In storage location only
  - H. Placed nearby only
  - I. All of the above
  - J. Other (specify): \_\_\_\_\_

22. If a 10-minute self-contained self-rescuer (SCSR) was available built into a vest would you consider wearing it?
- C. Yes
  - D. No

If not, please explain:

23. How would you prefer to use a 10-minute vest-style SCSR?
- F. Worn only
  - G. In storage location only
  - H. Placed nearby only
  - I. All of the above
  - J. Other (specify): \_\_\_\_\_

24. What functionality, other than acting as an SCSR, would you expect from a vest-style SCSR (i.e. pouches to carry other equipment, hydration pouch, etc.)?



