

Attachment C: Structured Interview Protocol

Structured interview protocol

Thank you for agreeing to participate in this important project for the NIOSH Office of Mine Safety and Health Research. The objective of the project is to characterize barriers to development, commercialization, and adoption of safety and health protection technologies for underground coal (and other gassy) mining. Information about barriers is being collected through a series of structured interviews with representatives of organizations associated with underground coal mining. We are using a standardized question protocol for all interviews to facilitate analysis, such as identifying areas of agreement and similarities and differences among organization types.

Your participation in this interview is voluntary. The interview will cover hazards associated with underground coal mining, safety and health protection technology, and safety and health protection technology development, commercialization, and use. Participation will involve responding to questions about your opinions and experiences. You can refuse to answer any questions and can stop participating at any time. Refusal to participate or discontinuing participation will involve no penalty or loss of benefits to which you are otherwise entitled. Your participation is expected to last 1 hour. Your responses will be kept private and you can stop participating at any time. Neither your identity nor the name of your organization will be revealed to NIOSH or made public. Specific information linking interviewee name and organization to particular interview responses will not be included in any information viewed by NIOSH or in any presentations or reports produced in the course of the study. Interviews will be audio recorded to ensure that all information is captured. Audio recordings will be used only by [contractor name] and not shared with NIOSH.

There is a small risk that your participation or the information you provide us will not remain confidential. To avoid loss of confidentiality, all potentially identifying information from the interviews will be carefully secured through password protection, encryption, locked file cabinets, and electronic permissions so as to minimize the risk of any breach of confidentiality. Identifying information and audio recordings will be destroyed at the end of the study.

Public reporting burden of this collection of information is estimated to average 1 hr per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing the collection of information. An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to CDC/ATSDR Information Collection Review Office, 1600 Clifton Road NE, MS D-74, Atlanta, Georgia 30333; ATTN: PRA (0920-xxxx).

There is no direct benefit to you, except that your help may improve the safety and health of

miners. There will be no costs to you, other than your time involved. If you have any questions or concerns regarding this study, you may contact [NIOSH technical contact] at [phone number]. If you have questions about rights or privacy, you may contact Sandra Berry, the Chair of the RAND Human Subjects Protection Committee, at 310-393-0411 x7779. Do you have any questions?

Definitions

- *Safety and health hazard*—any situation or circumstance that may lead to a worker suffering an injury or illness. This includes acute injuries, chronic injuries, and illnesses.
- *Safety and health protection technology*—Any physical hardware that provides worker protection. This includes hardware designed specifically for worker protection as well as aspects or components of hardware designed primarily for other purposes (e.g., mining equipment) that provide worker protection.
 - *Protection*—A means of accomplishing any of three functions: (i) protecting workers from injury or illness caused by hazards present during routine operations (e.g., hard hats, hearing protection), (ii) preventing potentially injury- or illness-causing incidents or conditions from occurring (e.g., proximity sensors, ventilation), (iii) reducing the impact or severity of injury or illness after an accident or under other emergency conditions (e.g., self-contained self-rescuers, refuge chambers).

Hazards Associated With Underground Coal Mining

1. What are the safety and health hazards associated with each of these underground coal mining activities?

Activity	Safety or Health Hazard
1.1. Mine construction (specialized development work such as shafts, slopes, overcasts, seals, etc.).	
1.2. Longwall mining (cutting of coal & transport to belt)	
1.3. Continuous mining for longwall development (cutting of coal & transport to belt, rock dusting)	
1.4. Continuous mining for coal production (cutting of coal & transport to belt, rock dusting)	
1.5. Retreat mining (cutting of coal & transport to belt, rock dusting)	
1.6. Installing permanent and temporary ventilation control devices (i.e., mine stoppings, brattice cloth)	
1.7. Installing roof & rib support	

(i.e., bolting, shotcrete, cribbing, screening)	
1.8. Coal transport from loading point on belt to surface (i.e., secondary and primary belt)	
1.9. Personnel and supply transport (mantrips & rail traffic)	
1.10. Mine maintenance (supplemental cribbing, setting posts, outby supplemental rock dusting, etc.)	
1.11. Equipment maintenance	
1.12. Advancement of mine infrastructure (e.g., electrical, water, refuge chambers)	
1.13. Other	

2. [\[Ask only if more than 6 distinct hazards are identified in Q1\]](#) Which are the top 6 of the above hazard-activity combinations ?

Currently Available Safety and Health Protection Technology

3. What are the most effective safety and health protection technologies available for the hazard-activity combinations you identified in Q1?
4. What features or capabilities are missing from current safety and health protection technologies?
5. Are there any hazards for which no protective technology exists at all?

Safety and Health Protection Technology Development and Use

6. How do you learn about new safety and health protection technologies?
7. Do you feel you are up to speed on the availability of current technologies and their readiness and effectiveness for use in underground coal mining?
8. Where do the ideas for and the development of new safety and health protection technology come from? What role do different stakeholder groups play in this process?

University researchers	
Government researchers	

Independent technology suppliers	
OEMs	
Mining companies	
Other	

9. What factors influence your organization's decisions to use or not use particular technologies? For each factor, please explain how it influences your decisions.

Protection effectiveness	
Regulatory requirements	
Worker acceptance	
Effects on productivity	
Cost	
Other	

10. Is your organization involved in the development of safety and health technologies for underground coal mining?

- 10.1. Which hazard-activity combinations from Q1 [\[read them back to interviewee\]](#) is the work addressing? [\[if more than one, cycle through Q10 for each combination\]](#)
- 10.2. Referring back to Q4 & Q5 [\[read them back to interviewee\]](#), what shortcomings with existing approaches is this work attempting to overcome?
- 10.3. Who supported/commissioned this work?
- 10.4. Does the work involve collaboration with other organizations?
- 10.4.1. If so, which stakeholder group(s)?
- 10.4.2. Please describe the collaboration
- 10.5. In addition to underground coal mining, does the work address technology relevant to other environments?
- 10.6. Have you pursued
- 10.6.1. Prototype development?
- 10.6.2. Pilot testing?
- 10.6.3. Commercial development?
- 10.7. What are the differences, if any, in development and approval for areas outside U.S. coal mining?

11. In your opinion, for the underground coal mining industry in general,

- 11.1. What are the barriers to innovation and development of new safety and health protection technologies for underground coal mining?

- 11.2. What are the challenges of bringing new safety and health protection technologies to market?
- 11.3. What prevents widespread adoption and use of available safety and health protection technologies throughout the underground coal mining industry?
12. Do you have any recommendations for ways to reduce these barriers?
13. Are there any technology solutions to safety or health risks that you would recommend that are not being implemented or have greatly lagged in implementation relative to other industries?
14. How is technology development and adoption for safety and health applications affected by the industry economic upswings and downswings?
15. Are you aware of new technologies that were proposed or developed but were never investigated further or commercialized? If so, please describe the technology and the reasons it was not pursued.