

**1Assessment of the Market for Electronic Technology for Underground Coal Mining Safety
and Health Applications**

Request for Office of Management and Budget (OMB) Review and Approval

Information Collection Request (ICR)

Supporting Statement A

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- Goal of the study: The goal of the study is to identify and prioritize barriers to the commercial development and adoption of underground coal mining safety and health protection technologies in the U.S.
- Intended use of the resulting data: The data collected will provide NIOSH with a more complete perspective of the barriers from the point of view of the mine operators and technology developers in order to improve the efficacy of the intramural and extramural research that NIOSH administers under the authority of the MINER Act.
- Methods to be used to collect: Structured interview and workshop
- The subpopulation studied: Stakeholders, such as suppliers, customers, researchers, and regulators, in the underground coal mining safety and health technology market
- How data will be analyzed: Descriptive analysis and Delphi method

Supporting Statement A

A.1 Circumstances Making the Collection of Information Necessary

The National Institute for Occupation Safety and Health (NIOSH) Office of Mine Safety and Health Research (OMSHR) of the Centers for Disease Control and Prevention (CDC) is requesting approval from the Office of Management and Budget (OMB) to conduct structured interviews and a prioritization workshop with stakeholders in the underground coal mining safety and health protection technology market. These two data collection processes will help identify and prioritize the barriers to the development and adoption of underground mining safety and health protection technologies.

This is a request for a new collection; approval is requested for three years. NIOSH OMSHR will contract with a vendor to conduct the information collection.

Underground coal mining in the U.S. is a relatively small industry (about 46,000 employees) that operates in a unique and hazardous work environment. The common presence of explosive gasses and other hazards creates special safety requirements for equipment, including safety and health protection technologies, used in underground coal mines.

The MINER Act of 2006 assigned NIOSH the responsibility to enhance development of new mine safety and health protection technology and technological applications and to expedite the commercial availability and implementation of such technology. The principal goal of this study is to identify the barriers to commercial availability and implementation of such technology in U.S. mines. Experience to date has shown that there are many issues that the U.S. mining industry faces that create barriers to the availability and implementation of safety technologies, and we believe there are other more subtle reasons that we do not fully understand as a Government research agency. The data are intended to provide insight into what the most important barriers are from

the perspective of the organizations that must purchase, use, approve, and manufacture these safety technologies. NIOSH has an understanding of some of these barriers, however NIOSH is not an end user of these products. Thus the goal of the study is to provide a complete perspective of the barriers from the point of view of the mine operators and technology innovators, in order to improve the efficacy of the contract and grant awards that NIOSH administers under the authority of the MINER Act.

The contractor will collect data from stakeholders, such as suppliers, customers, researchers, and regulators, in the underground coal mining safety and health technology market through the following methods:

- A set of structured interviews with representatives from as many as 100 different stakeholder organizations to identify and understand barriers to technology development and adoption.
- A workshop that will use the Delphi method to refine and prioritize the barriers.

The Federal Mine Safety & Health Act of 1977, Section 501, enables NIOSH to carry out research relevant to the health and safety of workers in the mining industry. A copy of this legislation can be found in Attachment A.

A.2 Purpose and Use of Information Collection

The data will be used for two purposes. The first is to help prioritize the use of NIOSH resources in its contracts and grants program as authorized under the MINER Act. This clarity is needed so that NIOSH can make the best use of the funds entrusted to it to expedite the availability and implementation of technologies. While there are many technologies that NIOSH could fund, the money to do so is quite limited, and NIOSH should focus on those that provide the most benefit with some realistic possibility of being adopted by the mining industry. In order to assess the likelihood of adoption, a thorough understanding of the implementation barriers is essential.

The second use of the data will be to identify those barriers that NIOSH may be able to help alleviate in its role as a research organization. Doing so would be consistent with the mandate of the MINER Act to help expedite the commercial availability of safety technologies. There are many perceived barriers to introducing technologies into the mines, and the data will help provide an understanding of which issues create the largest barriers and which ones are appropriate for NIOSH to try to influence. This is important because some of the known/suspected issues could require NIOSH to enter into research areas that require addition of new expertise and substantial commitment of resources. Such changes require a compelling reason to take on these challenges given the finite pool of resources and the competing budget priorities. Some of the suspected issues that fit into this category, which need to be explored as for their veracity and relative importance, include:

- The U.S. mining industry has a difficulty in driving demand because it is a relatively small market on a global scale. There are suggestions that the U.S.

mining market faces barriers in using safety technologies from other countries, and even other industries in the U.S., where similar functionality is needed.

- The U.S. mining industry faces special challenges in implementing safety and other technologies as a result of the requirement to demonstrate that new approaches to meeting safety standards provide at least the same level of protection as existing approaches as approved by MSHA. This is in contrast to nearly all other industries, which must provide a sufficient level of safety (irrespective of a past standard or practice) and which can adopt new consensus based standards without explicit approval of OSHA of the new standard. While safety advocates agree with the intent to not reduce the level of safety in mining, the approval logistics associated with meeting this requirement may create a barrier for the introduction of new products into the mining industry, particularly those that change the way in which the level of protection is provided to the miner.
- It has been suggested that technology innovators and technology companies do not have the information they need to understand how their products might help the mining industry, and therefore avoid the mining market.
- The ability to identify the relative safety benefit and how technologies fit into the mining cycle, either through simulation or analysis as necessary for a cost benefit evaluation, may be a gap for many mine operators.

If the data indicate that these barriers are substantial, NIOSH could take more of a role in removing some of these barriers, but to do so could have significant resource implications. The data will help NIOSH understand what the most important barriers are amongst these possibilities from a market perspective, and thereby provide needed insight as to where the NIOSH technology research efforts could be most beneficial to mine workers. It is likely that the data collection will also reveal important barriers that NIOSH is not aware of and that could benefit from additional research. It is also possible that some of the barriers will have nothing to do with research. This is also important for NIOSH to understand so that it is not trying to promote technologies that cannot be adopted due to barriers that are beyond the ability of NIOSH to correct.

A.3 Use of Improved Information Technology and Burden Reduction

The workshops will utilize a computer-based instrument for Delphi data collection. All participants will enter responses into a web-based survey instrument. This input method will be faster for respondents and allow for anonymous responses. During a brief break, workshop facilitators will retrieve the results, analyze the anonymous responses and present the results back to the group for discussion.

A.4 Efforts to Identify Duplication and Use of Similar Information

NIOSH OMSHR has made every reasonable attempt to ensure that the interviews and workshop do not request data and information that are currently available or are obtainable through less burdensome mechanisms.

A search of the academic and grey literature found no work addressing the questions that are the focus of this information collection request. While NIOSH has conducted surveys and other research related to safety and health in mining, none has addressed the question of barriers to the development or adoption of safety and health protection technology. NIOSH is not aware of any similar parallel effort underway by another organization.

A.5 Impact on Small Businesses or Other Small Entities

Both interviews and the workshop will have minimal impact on small entities, as only one individual from small companies will be asked to participate. Further, the interview protocol includes only the minimum number of questions required to address the research questions a completion of the interview will require minimal time out of a respondent's workday (approximately 60 minutes). The workshop is a one-day event and will be held in a location that will minimize travel requirements for the majority of participants.

A.6 Consequences of Collecting the Information Less Frequently

The structured interviews and prioritization workshop will be one-time data collection efforts. Collection of the information sought in the project has never been done before. As described in more detail in Sections A.1 and A.2, these data are critical to NIOSH's efforts to fulfill its responsibility under the MINER Act to alleviate barriers and expedite the availability and implementation of safety and health protection technologies.

A.7 Special Circumstances Relating to the Guidelines of 5 CFR 1320.5

This request fully complies with the regulation 5 CFR 1320.5(d)(2).

A.8 Comments in Response to the Federal Register Notice and Efforts to Consult Outside the Agency

The notice required in 5 CFR 1320.8(d) was published in the *Federal Register* on January 17, 2017, vol. 82, No. 10, pp. 4885-86 (see Attachment B). CDC did not receive public comments related to this notice.

The RAND Corporation was consulted in 2016 about identifying the appropriate pool for participants in interviews and the workshop, developing the interview protocol, and developing a workshop plan and agenda. A list of these persons is provided below:

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A.9 Explanation of any Payment or Gift to Respondents

There will be no payments or gifts to respondents who complete the interview or participate in the workshop. Travel costs and per diem for workshop participants will be covered. This cost will vary depending on how far from the workshop site the participant lives.

A.10 Protection of Privacy and Confidentiality of Information Provided by Respondents

NIOSH Information Systems Security Officer reviewed this submission and determined that the Privacy Act does apply. The study will collect names and contact information (i.e., organization name, address, telephone number, email address) of individuals at stakeholder organizations who will be asked to participate in the interviews and workshop on the stakeholder organization's behalf.

NIOSH will keep the interview and workshop data private and secure to the extent permitted by law. Although the individual will be asked to report his/her position and responsibilities, this information will be used solely by the contractor to categorize and summarize types of respondents for comparison purposes during the analysis phase of the project. Specific information linking respondent name and organization to particular interview or workshop responses will not be included in any presentations or reports produced in the course of the study. All potentially identifying information from the interviews and workshop will be carefully secured through password protection, encryption, locked file cabinets, and electronic permissions so as to minimize the risk of any unintended release.

Information collection instruments for the interviews and workshop are provided in Attachments C1, C2 and C3. Instructions to interview respondents and workshop participants are provided in Attachments D1 and D2. Participants will be informed that specific information on individual respondents or organizations will not be revealed to NIOSH or made public. Complete consent language is provided in Attachments D3 and D4. Introductory and follow-up letters to participants are provided in Attachment E.

A.11 Institutional Review Board (IRB) and Justification for Sensitive Questions

IRB Approval

The RAND Corporation Human Subjects Protection Committee, the IRB of the intended vendor for this work, has determined that this project does not involve human subjects

as defined by the regulations at 45 CFR 46.102(f) and therefore is not subject to further review. Notification of this determination is included as Attachment F.

Sensitive Questions

The NIOSH data collection does not include any questions of a sensitive nature. Respondents to the interview will be asked to provide information on different underground coal mining hazards, technologies used to reduce those hazards, outstanding needs in safety and health protection, how decisions about technology development and adoption are made, and the barriers to technology innovation, production and adoption. The questions are not designed to solicit personal information from the respondent other than their role at the organization. The contractor will not share any information that will identify individuals and/or their companies with NIOSH or anyone outside of the contractor research team. All potentially identifying information will be carefully secured so as to minimize the risk of any unintended release.

A.12 Estimates of Annualized Burden Hours and Costs

Data collection activities will include structured interviews and a workshop. Pre-calls to 200 stakeholder organizations will be conducted to solicit participation. 150 representatives from these organizations will participate in structured interviews. 30 representatives from these organizations will participate in the workshop.

Pre-calls are expected to require 15 minutes to complete and the structured interview is expected to require 1 hour to complete, including the time it may take respondents to look-up and retrieve needed information. Respondents will participate in the structured interview one time only, responding via telephone interview. Hour burden estimates are based on past experience with broadly analogous interview efforts.

The burden table below reflects 15 hours of burden for each workshop group. This includes the in-person participation of 9 hours and 6 hours of travel time. A total of 10 respondents per year will participate in the workshop.

Based on the mix of stakeholder organizations targeted (see Statement B for list of stakeholder organization types), participants in the structured interviews and the workshop are anticipated to be a mix of approximately 50% General and Operations Managers, 25% Industrial Production Managers, and 25% Architecture and Engineering Occupations.

Data collection activities will take place over 3 years. The estimated total burden hours for the respondents' time to participate in this information collection is 650 hours. The estimated annualized burden hours for the respondents' time to participate in this information collection is 217 hours. Estimated annualized burden hours are presented in the table below.

Estimated Annualized Burden Hours

Type of Respondent	Form Name	Number of Respondents	Number of Responses per Respondent	Average Burden per Response (hours)	Total Burden Hours
Receptionists	Pre-call	67	1	15/60	17
General and Operations Managers	Structured Interview	25	1	1	25
Industrial Production Managers	Structured Interview	13	1	1	13
Architecture and Engineering Occupations	Structured Interview	12	1	1	12
General and Operations Managers	Workshop	5	1	15	75
Industrial Production Managers	Workshop	3	1	15	45
Architecture and Engineering Occupations	Workshop	2	1	15	30
Total		127			217

The estimated cost burden for the respondents to participate in this research is \$31,645. The estimated annualized cost burden for the respondents to participate in this research is \$10,548. Estimated annualized burden costs are presented in the table below.

Estimated Annualized Burden Cost

Type of Respondents	Total Burden hours	Hourly Wage Rate ⁽¹⁾	Total Respondent Costs
Receptionists	17	\$17.38	\$290
General and Operations Managers	100	\$57.44	\$5,744
Industrial Production Managers	53	\$49.87	\$2,626
Architecture and Engineering Occupations	47	\$39.89	\$1,888
Total	217		\$10,548

(1) Average hourly wage was derived from the Bureau of Labor and Statistics Occupational Employment Statistics (OES) survey for May 2015. (http://www.bls.gov/oes/current/oes_stru.htm)

A.13 Estimates of Other Total Annual Cost Burden to Respondents or Record Keepers

Data collection for this study will not result in any additional capital, start-up, maintenance, or purchase costs to respondents or record keepers.

A.14 Annualized Cost to the Federal Government

NIOSH is supporting the conduct of this data collection and analysis of data as part of the contract with an outside vendor. The work will be conducted in stages. There will be an initial stage of 50 interviews, a second stage of 50 interviews, and the workshop. NIOSH will review progress after each stage and assess whether the additional stages are needed or whether the project should proceed directly to analysis and producing the final report. We therefore provide separate cost estimates for four different project versions that include different combinations of interviews and the workshop. Each estimate includes costs for design, fieldwork, analysis, and producing the final report. In addition, a portion of the costs are for personnel costs of Federal employees involved in the oversight of information collection. The total annualized cost for the data collection effort is the sum of the annual contracted data collection cost and the annual Federal labor cost (see Table). For the complete project version (100 interviews plus workshop), the total annual cost is \$235,545.

Estimated costs

Project version	Vendor cost	Federal labor cost	Project duration	Annual cost
50 interviews	\$226,000	\$19,736	24 months	\$122,868
50 interviews plus workshop ¹	\$388,000	\$19,736	30 months	\$163,094
100 interviews	\$364,000	\$29,604	36 months	\$131,201
100 interviews plus workshop ¹	\$520,000	\$29,604	42 months	\$157,030

A.15 Explanation for Program Changes or Adjustments

This is a new data collection.

A.16 Plans for Tabulation and Publication and Project Time Schedule

The contractor anticipates doing descriptive analysis with the information gleaned from the structured interviews. Interview notes will be coded using text analysis software and be summarized in paragraph form. The analysis will describe the stakeholder sample and types of organization by industry and technology type. Further analysis will focus on identify the production process and examine hazards and safety and health technology questions associated with each mining activity. The barriers identified in the stakeholder interviews will form the basis for the prioritization workshop.

The purpose of the workshop will be to prioritize the barriers identified in the stakeholder interviews. This will be accomplished with a Delphi consensus-building workshop. The Delphi method is an interactive, iterative process for gaining a semi-consensus view on complex questions. In the traditional Delphi panel, participants

¹Workshop costs include travel reimbursement for workshop participants

anonymously provide answers to a survey; their judgments are combined (e.g., averaged) and subsequently fed back to the group members, who review the feedback and answer a second set of questions (which may have been modified based on the results of the first round). This process is repeated until either consensus among participants is reached or a pre-determined number of rounds have passed.

The analysis of data from this assessment will be used to develop a final report to NIOSH.

Project Time Schedule (for 100 interviews plus workshop)

Activity	Time Schedule
Develop participant list	0-2 months after OMB approval
Interview pre-calls	2-30 months after OMB approval
Structured interview data collection	2-30 months after OMB approval
Prioritization workshop	36 months after OMB approval
Analysis	36-39 months after OMB approval
Draft final report	39 months after OMB approval
Final report	42 months after OMB approval

A.17 Reason(s) Display of OMB Expiration Date is Inappropriate

NIOSH does not seek this exception.

A.18 Exceptions to Certification for Paperwork Reduction Act Submissions

There are no exceptions to the certification.