

Request for Office of Management and Budget Review and Approval for Federally Sponsored Data Collection

## **Mobile Proximity Initial User Feedback**

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Supporting Statement B

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Attachment E – IRB Approval/Exemption Letter

Attachment F – Interview Protocol

Attachment H – Mine Recruitment Script

Attachment I – Informed Consent Script

# Supporting Statement B

## 1. Respondent Universe and Sampling Methods

The proposed study will focus on underground coal mines located in the U.S. In 2014, the Mine Safety and Health Administration (MSHA) reported a total of 447 active, underground coal mines (NIOSH, 2014). An active mine can be defined as a mine operation which reported the employment of a mine operator during the survey year (NIOSH, 2014).

According to MSHA, the proposed rule, which requires proximity detection systems on mobile equipment, has the potential to affect 300 active, underground coal mines. Moreover, in 2014, MSHA estimated that 1,987 coal hauling machines and scoops would be affected by the proposed rule. As of June 2015, approximately, 155 underground coal hauling machines and scoops had been voluntarily equipped with proximity detection systems.

Following a recent downturn in underground coal mining, many mines have been reported as temporarily idled or abandoned (MSHA, 2017). A report generated in May of 2017 from the MSHA Mine Data Retrieval System, showed a total of 210 active underground coal mines (MSHA, 2017). The proposed study will focus on the active, underground coal mines that are currently using proximity detection systems for mobile equipment. Participants for the study will be employed by these mines. In early 2017, MSHA reported that 12 underground coal mines were using proximity detection systems on mobile equipment. Currently, there are two MSHA-approved mobile proximity models, with approximately half of the mines using one or the other. Information for these mines is provided in Table 1.

**Table 1. Active Underground Coal Mines Using Proximity Detection on Mobile Equipment**

Mine	MSHA District	Number of Employees	Mine Type
1	2	608	Underground
2	2	605	Underground
3	2	224	Underground
4	3	167	Underground
5	4	234	Underground
6	5	127	Underground
7	5	463	Underground
8	8	291	Underground
9	8	270	Underground
10	8	147	Underground
11	9	257	Underground
12	9	203	Underground
<b>Total</b>		<b>3,596</b>	

## 2. Procedures for the Collection of Information

Data will be collected using semi-structured interviews. A semi-structured interview is a qualitative research method, which allows the researcher to collect participant interpretations by asking open-ended questions and probing for additional information and clarification (Galletta, 2013). For the proposed study, semi-structured interviews will allow researchers to collect various perspectives and interpretations related to how workers currently experience, use, and understand proximity systems on mobile equipment. A maximum of 250, 10-minute interviews will be conducted. Data collection will conclude when data saturation is achieved. Past literature claims that data saturation has been achieved when (1) the study can be replicated (O'Reilly & Parker, 2012), (2) new findings have been identified (Guest et al., 2006), and (3) coding possibilities have been exhausted (Guest et al., 2006).

To collect additional data regarding how mine workers are using proximity systems on mobile equipment, researchers will observe select interview participants while they are performing their assigned job duties. Observations will be at the discretion of the mine operator and optional for participants. During observations, researchers will occupy a safe location in the mine and observe participants as a group working for approximately one hour. Researchers will observe multiple workers as they interact with proximity systems on mobile equipment. A total of five researchers will be designated to facilitate interviews. However, to reduce the potential burden on the mine, only 1-3 facilitators will visit each mine. All interviewers will utilize the interview protocol to ask questions (see Attachment B). The following outlines the specific steps used to recruit participants and collect data.

**(1) Recruiting the Mines.** Since proximity detection systems on mobile equipment has not been widely adopted, mines will be recruited through existing professional relationships with mine operators who have adopted the new technology. More specifically, researchers will use their professional networks, the geographic location of the mine, and the model of mobile proximity systems used to determine which mines will be contacted for the study. For example, if a researcher has worked with a particular mine in the past and has established rapport with the health and safety manager, this mine may be approached to participate.

Ideally, two mines from each of the following coal regions will be recruited: West, Illinois Basin, and Appalachian regions. Qualifying mines will be contacted by phone or email. A recruitment script will be used to develop initial emails and guide phone conversations (see Attachment H). Mines fitting the criteria may also be recruited during interactions at industry-specific conferences. A follow-up call or email will also be used to recruit these mines. After the mine operator agrees to support the study, researchers will work to coordinate a convenient date and time to visit the mine site during standard hours of mine operation.

**(2) Recruiting the Mine Workers.** A convenience sampling approach will be used to recruit mine workers. During the shift, mine workers will be notified of the study and invited to participate. Researchers will work with the mine operator and shift supervisor(s) to designate a place at the mine to conduct observations and interviews with the crew members. To capture a variety of perspectives, various members of the section crews will be invited to participate in the interviews, minimally including the following crew members (see Table 2). The purpose of the study will be described to the participants. Researchers will emphasize that participation is voluntary and that participants will not receive compensation. Any mine worker fitting the inclusion criteria will be invited to participate in the study.

**Table 2. Job Titles of Qualifying Participants**

Production Crew	Maintenance Crew
Ram Car Operator	Ram Car Operator
Continuous Miner Operator	Maintenance Worker
Section Foreman	Section Foreman

**(3) Gaining Informed Consent.** Prior to the interview, mine workers will be approached individually or as a group to gain informed consent. The researcher will review the consent script (see Attachment I) with the individual or group. A hardcopy of the consent will be offered to the mine workers. Immediately before an interview, the mine worker will be individually asked for verbal consent. Mine workers will be informed that the study is voluntary and they will have the option to not participate. Since the study presents no more than minimal risk of harm to subjects and involves no procedures for which written consent is normally required outside of the research context, a waiver of documentation of informed consent was approved by the NIOSH IRB, HSRB on May 25, 2017 (see Attachment E).

**(4) Conducting the Interviews.** Face-to-face interviews will be conducted. Interviews will last a maximum of 10 minutes depending on the depth of the participant's responses. Most interviews are expected to take 5 to 10 minutes. Depending on the number of facilitators present at the mine site,

multiple interviews may be conducted simultaneously to reduce the burden to the mine. The facilitator will ask questions based on the interview protocol and probe for clarification and additional information. The facilitator will take notes during the interaction. The facilitator will not collect any personally identifiable information.

**(5) Conducting Optional Observations.** Following the interviews, some mine workers may be observed as a group performing their normal duties for up to one hour. Observations will be conducted at the discretion of the mine operator. From a safe, designated location in the mine, researchers will observe multiple shift workers and take field notes. To observe crew members in a designated section, researchers will obtain verbal consent from all miners who may be observed. If a crew member in the designated section chooses to be excluded from the study, the section will not be observed. Specific focus will be given to the following factors.

- How the miners interact with the proximity system
- Any errors that may occur during use
- Any problems with the system
- If outside help or counsel is necessary to use the system
- Any deviation from typical mining behavior required to accommodate the system
- Any environmental factors that appear to cause difficulty or change the use of the system

**(6) Managing the Data.** Once the interviews are completed, the facilitators will place all interview notes in a secure location. To protect the confidentiality of the participants, the notes will not be shared with the mine operators or supervisors. The name and location of the mine also will be removed from all data. Participants will be identifiable by an assigned identification number.

### **3. Methods to Maximize Response Rates and Deal with No Response**

Since the study is being conducted to explore mine workers' experiences with a new technology (i.e., proximity systems for mobile equipment), it is anticipated that any data collected will offer valuable information. However, the quality of the data and findings will be significantly influenced if researchers do not recruit an adequate number of participants to reach data saturation. For example, a low response rate may result in limited diversity across the roles and duties of the workers represented in the sample. This would affect the types of recommendations which can be made regarding the use of proximity systems on mobile equipment.

Based on the consent rate from previous studies involving a similar sample, an 80% response rate is expected. For example, the response rate for a safety culture assessment conducted by NIOSH Office of Mine Safety and Health Research (OMSHR) was between 80% and 90% (see Peters & Kosmoski, 2014).

Unfortunately, due to the nature of field research, it will be difficult to ensure participation. In an effort to maximize the response rate, NIOSH researchers will work to (1) clearly communicate expectations with mine operators, (2) schedule mine visits on days and during shifts where the maximum number of mine workers can be reached, (3) ensure the interview takes 10 minutes to complete to minimize disruptions to daily operations.

### **4. Tests of Procedures or Methods to be Undertaken**

The interview protocol was reviewed internally by CDC/NIOSH behavioral research scientists, engineers, and former mine workers to ensure readability and relevance. A time test was also conducted to ensure the interview could be completed in 10 minutes.

## 5. Individuals Consulted on Statistical Aspects/Individuals Collecting and/or Analyzing Data

The proposed study does not require in-depth statistical analysis. The data will be coded and themes will be identified. Descriptive statistics will be used to summarize the data including counts and means.

The following individuals will assist with leading study design, data collection, and data analysis. If additional assistance or guidance is required regarding data collection, analysis, or management, other internal resources are available through teams within the project staff's branch.

<b>Personnel</b>	<b>Title</b>	<b>Organization</b>	<b>Phone</b>	<b>Email</b>
Jennica Bellanca, MS	Mechanical Engineer	NIOSH/PMRD	(412) 386-6445	jbellanca@cdc.gov
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