
WORKERS' RIGHTS – ACCESS, ASSERTION, AND KNOWLEDGE IN MINING WORKPLACES:

ASSESSING THE FEASIBILITY OF DEVELOPING A MEASURE OF WRAAK IN MINES AND DIFFERENT MODES OF DATA COLLECTION

Final Report

Prepared for:

U.S. Department of Labor
Office of the Assistant Secretary for Policy (OASP)
Chief Evaluators Office
Washington, D.C.

Prepared by:

Eastern Research Group, Inc.
Lexington, Massachusetts

June 20, 2013



TABLE OF CONTENTS

<u>1.0</u>	<u>INTRODUCTION</u>	<u>1</u>
<u>2.0</u>	<u>STUDY PARAMETERS AND TIMELINE</u>	<u>3</u>
2.1	SCOPE AND DEFINITIONS	3
2.2	TIMELINE AND PROJECT WORK	3
<u>3.0</u>	<u>MEASURING WRAAK IN THE MINING WORKPLACE</u>	<u>7</u>
3.1	TARGETED LITERATURE REVIEW	7
3.2	CONCEPTUAL MODEL OF WRAAK	9
3.3	SURVEY INSTRUMENT	12
<u>4.0</u>	<u>PILOT DATA COLLECTION METHODS</u>	<u>17</u>
4.1	SELECTION OF DATA COLLECTION MODES TO PILOT TEST	17
4.2	PHONE AND ONLINE SURVEY: ADVERTISEMENT RECRUITMENT	19
4.3	PAPER SURVEY: STATE GRANTEE TRAINING SESSIONS	21
4.4	SUMMARY	23
<u>5.0</u>	<u>SUMMARY OF COLLECTED DATA</u>	<u>25</u>
5.1	DEMOGRAPHICS	25
5.2	RESULTS BY VOICE CONCEPT AND INSTRUMENT FORMAT	25
5.3	OPEN-ENDED COMMENTS FROM MINERS	ERROR! BOOKMARK NOT DEFINED.
5.4	ASSESSMENT OF CONCEPTUAL MODEL OF WRAAK	33
<u>6.0</u>	<u>OBSERVATIONS AND RECOMMENDATIONS</u>	<u>41</u>
6.1	OBSERVATIONS	41
6.2	RECOMMENDATIONS	42
Appendix A: Statement of Work		
Appendix B: Final Design Report		
Appendix C: OMB Package		
Appendix D: Cognitive Interviewing Report, Script, and Copy of Instrument Used		
Appendix E: Tabulated Survey Results		

EXECUTIVE SUMMARY

Overview

In 2010, Secretary of Labor Hilda L. Solis made *Good Jobs for Everyone* the strategic vision for the Department of Labor (DOL), characterizing a good job as one that “...is safe and secure and gives people a *voice* in the workplace”¹ (emphasis added). From this vision, DOL developed the concept of “Worker’s Rights – Access, Assertion, and Knowledge” (WRAAK) as a way of measuring Secretary Solis’ vision.² The purpose of this project was to develop a measure of WRAAK and to pilot test methods for collecting data on WRAAK from miners. DOL awarded a task order to Eastern Research Group, Inc. (ERG) and its subcontractor, the National Opinion Research Center at the University of Chicago (NORC), to conduct this study to identify meaningful measures of WRAAK in the coal mining industry. The primary research question for this study was:

What measures of WRAAK and perceived non-compliance, combined with what modes of data collection could be best used to track MSHA’s worker protection outreach activity?

DOL directed ERG to perform this as a *pilot project*, focusing on (1) developing a measure of WRAAK, (2) developing a survey instrument to collect data on WRAAK, and (3) assessing the feasibility of different data collection modes. At the outset, DOL and ERG agreed that development of a statistical sampling plan for collecting representative data and collecting a large number of responses was out of scope for the project. This report provides the outcomes from this pilot study. As such, the data presented in this report should not be considered representative of the population we focused on (coal miners). Rather, the focus is on reporting on the measure of WRAAK that was developed and its associated survey instrument and the efforts that were undertaken to test data collection modes.

To answer the study question and implement this pilot study, ERG:

- Developed a conceptual model for WRAAK that identified the factors that lead workers to feel more comfortable in exercising their rights.
- Developed and performed cognitive testing of a survey instrument to measure the concepts from the conceptual model.
- Identified several data collection modes to collect data from miners.
- Assembled a Technical Working Group (TWG) of experts in this area and obtained feedback from the TWG on the survey instrument and the potential data collection modes.
- Implemented two data collection modes based on TWG recommendations.

¹ Testimony of Secretary of Labor Hilda L. Solis before the Subcommittee on Labor, Health and Human Services, Education and Related Agencies Committee on Appropriations, U.S. House of Representatives, March 10, 2010. http://www.dol.gov/sec/media/congress/20100310_appropriations.htm

² During the study, DOL shifted from the use of the term “voice in the workplace” to “Worker’s Rights – Access, Assertion, and Knowledge” to better communicate the focus of the DOL initiative compared to the description of voice in the literature. The academic literature on voice in the workplace focuses on the ability of an employee to speak up about any issue in the workplace; the DOL initiative, on the other hand, focuses on the ability of the worker to act on issues related to their rights.

- Summarized the collected data.

Collecting survey data from miners is complicated by several factors. First, based on MSHA preliminary year-end data,³ there were approximately 388,000 miners in the United States in 2012. A random digit dial survey would find it difficult to obtain responses from this population at a reasonable cost. Second, there are complex relationships between miners and operators. In some cases, miners may feel a loyalty to their employers and may not want to divulge harmful information about their employer. In other cases, miners may be concerned that taking the survey would lead to some form of retaliation (e.g., termination, loss of good shifts, etc.) from their employer. These complexities led to the need for the approaches considered under this project.

As noted above, ERG implemented two data collection methods:

- *Paper surveys distributed through state grantee training sessions.* ERG distributed survey packets (including the survey instrument, FAQs, and a self-addressed stamped envelope) to instructors of state grantee funded mine safety and health training courses who would distribute the survey to their trainees.
- *Online survey with recruitment through newspaper advertisements.* Information about the survey was distributed through advertisements in local newspapers. Miners interested in responding could call the toll-free phone number or visit the website to participate.

Implementation

ERG implemented the survey using the two methods described above after receiving OMB approval on January 10, 2013. This date was well beyond when ERG had anticipated OMB approval and required an extension to ERG's contract. Although DOL extended the contract, the extension was granted only through April 23, 2013 meaning that ERG had three and half months from time of OMB approval to contract end to collect data, write a draft report, hold a second TWG meeting, and submit a final report. This tight schedule meant ERG had limited time to collect data under this project. ERG collected data from January 26, 2013 through March 22, 2013. During this time period, ERG was able to collect 21 in-scope responses⁴ from the newspaper recruitment and 17 from the state grantee training approach for a total of 38 in-scope responses. As noted above, collection of representative data was not the purpose of this study. The purpose was to assess the modes of implementation. Thus, the data collected under this project reflect only the sample and cannot be extrapolated to the population as a whole.

State Grantee Training

MSHA provides grant funding to states to offer training sessions for miners.⁵ Mine operators are not required to use the state training providers that receive MSHA grants. Operators can contract with

³ See <http://www.msha.gov/MSHAINFO/FactSheets/MSHAFCT10.HTM>

⁴ In-scope responses were defined as individual who (1) indicated they currently work in coal mining or worked in coal mining within the last two years and (2) identify themselves as are either "miner" or a "front line supervisor or foreman." Excluded from the in-scope respondents were those that identified themselves as a "mine manager."

⁵ <http://www.msha.gov/PROGRAMS/EPD4.htm>.

independent training contractors or develop and conduct their own training. Data and information on the types of mines that utilize the state grant training was not available.⁶ If DOL were to implement a survey using this mode, work would need to be done to characterize the types of mines that access MSHA-funded State training.

ERG called training program contacts to explain the purpose of the project, describe the survey, gauge interest in participation, and identify training sessions when the surveys could be distributed. If possible an ERG staff person attended the training in person to distribute the surveys, in other cases the training program contact was sent a batch of survey packets to distribute. The packets contained a copy of the survey, a list of FAQs, and a self-addressed stamped envelope. In some cases, either the grantee or the mine operators declined to participate.

A total of 75 paper surveys were distributed through state grantee training programs. A total of 17 surveys (all in-scope) were received in their return envelopes at ERG. This is a response rate of 22.7 percent (all responses were in scope). Surveys were successfully distributed at three separate sites; five classes at which the survey was scheduled to be distributed were cancelled, distribution was declined by the operator or, on one occasion, the grantee contact felt it imprudent to request permission. In addition, one program declined to distribute the survey, and another was refused by all operators that had trainings scheduled for February and March.

Newspaper Recruitment

Based on feedback from the TWG, MSHA, and DOL, the recruitment through newspaper advertisements focused on the West Virginia, Eastern Kentucky, and Pennsylvania markets. We identified three newspapers with distribution in areas with high numbers of coal mining employees. The newspapers and days in which we ran the ads were:

- The Charleston Gazette (WV): 2/17, 2/19, 2/21, 2/24; and, the Coal feature section on 3/3.
- The Washington Observer-Reporter (PA): 2/24, 2/26, 2/28, and 3/3.
- The Uniontown Herald-Standard (PA): 2/24, 2/26, 2/28, and 3/3.

ERG worked with advertising representatives at each newspaper to schedule an approximately two by four inch black and white advertisement to run in the Classified section for four days (two Sundays and the Tuesday and Thursday between).

ERG used two different URLs to track responses to the ads by state; respondents to the Charleston Gazette ad used the URL www.minersurvey.com, while respondents to the two ads running in Pennsylvania used the URL www.minersurvey1.com. We received a total of 29 responses through the web-based instrument (25 from the West Virginia paper and 4 from the two Pennsylvania papers combined). Of these 29 returned surveys, only 18 were in-scope responses.⁷ Additionally, ERG received

⁶ Furthermore, collection of this information by ERG under this project would have required significant expenditure of resources. Given that this information primarily benefits a sampling plan and not the goals of this specific pilot, it was determined this information would not be collected under this project.

⁷ See footnote 4.

eight calls through the toll-free phone number from respondents who requested that a paper copy of the survey be mailed to them; five of these were returned with three being in-scope responses.

Summary of Collected Data

Despite the small number of responses, ERG summarized in the data in the main body of the report. Given the small numbers of respondents to the survey, however, the results in the data summary can only be attributed to the survey respondents themselves and not to the larger population of coal miners. The highlights of that data summary include:

- Respondents to the survey exhibited a strong overall understanding of their rights under the Mine Safety Act. ERG asked respondents if they were aware of certain rights prior to taking the survey and for almost all of the rights we asked about 80 percent or more of the respondents indicated they were aware of the rights.
- When we then asked respondents if they were willing to act on specific rights, for most rights we asked about, 70 – 80 percent of the respondents were willing to act on them.
- Respondents that used more of MSHA’s outreach materials had a better understanding of their rights.
- 27 of the 38 respondents indicated that they felt MSHA stood up for their rights and 24 of 38 trusted MSHA to keep what miners tell them confidential.
- 23 of the 38 said they felt free to exercise their rights. This left 15 respondents who felt some reservation about exercising their rights. When we explored this further, we found that respondents who had better understanding of their rights and those that had used more of MSHA’s materials tended to be the ones who felt freer to exercise their rights.

Observations

Based on the results of the project, ERG developed a number of observations about this pilot implementation. As has been noted above, the purpose of this project was to develop a measure of WRAAK, develop a survey instrument to collect data on the measure, and assess some implementation modes for collecting the data. Thus, our observations reflect these objectives and do not assess the level of WRAAK among coal miners. Our observations include:

- ***The survey instruments were effective at collecting responses, but this conclusion was based on few responses.*** In reviewing the way in which respondents answered the questionnaire, we found that respondents did not tend to skip questions, including questions that we anticipated to be difficult for respondents.⁸ There were a few questions that were left blank by respondents; in those cases each question was skipped by fewer than four respondents.

⁸ These included questions about exercising their rights under the law, reporting safety and health hazards, reporting injuries, and their mine name. Naturally, on the paper version of the instrument, it was possible for respondents to skip these questions. The online version also allowed respondents to skip these questions.

- **Most respondents are aware of the outreach materials.** The overarching study question asks about what measures and modes could be used to track MSHA outreach activities. About 50 percent or more respondents indicated that they were aware of each material. Thus, tracking outreach does appear to be possible given the awareness of the materials.
- **Responses appear to be internally consistent.** In general, most respondents indicated strong agreement with statements about awareness of their rights, and comfort acting on those rights, which is consistent with the number of respondents providing a high rating of their freedom to act on their rights in their workplace without fear of retaliation.
- **The data collected under the survey provide some support for the conceptual model of voice.** ERG analyzed the survey data using the conceptual model as a basis for the analysis and found support for some of the linkages in the model. However, the lack of data collected under the survey limits the strength of this conclusion.
- **WRAAK measures require more data and analysis to provide actionable information.** While the responses to the survey provide useful evidence to support the framework, additional data would be required to perform a calculation of the WRAAK measures and perform analyses needed to validate the approach. Additionally, in order to provide useful feedback that DOL could use to track and target worker protection outreach activity the survey would need to collect a sufficient number of responses at the MSHA district office level. This would be the minimum amount of information needed to identify geographic areas with problematic results that could be targeted with additional outreach activities.
- **The newspaper advertisement method is easy to monitor but inconsistent and expensive.** ERG used three different newspapers and had moderate success with one and very limited success with the other two. Thus, the ad cost per respondent was very high and the responses to the online survey primarily reflected conditions in West Virginia (where we had moderate success). However, once the web-based survey instrument is set up and the advertisement scheduled this data collection approach is very easy to monitor and manage over the desired timeframe.
- **The training event recruitment approach must balance survey distribution with training program needs.** ERG found the state grantee training program contacts to be very friendly and interested in supporting the survey effort; however, these programs provide a service to the mine operators and must maintain professional relationships with them. As a result, the training program contacts preferred to obtain the permission of the mine operator before distributing the survey package during their training events; some mine operators declined. It is likely that the mine operators who are comfortable with the survey distribution are also creating a more supportive safety and health environment for their employees and this would be reflected in the survey results, possibly biasing the sample. Additionally, this approach requires a longer timeframe for scheduling survey distribution due to the need to coordinate with scheduled training events and secure the cooperation of the training program and mine operator.

Recommendations

Based on the results of this pilot, ERG has developed the following recommendations on how to implement this type of survey. As has been noted above, the purpose of this project was to develop a measure of WRAAK, develop a survey instrument to collect data on the measure, and assess some implementation modes for collecting the data.

- **ERG recommends continued use of the conceptual model that we developed as a framework for viewing WRAAK in mining workplaces.** The analyses we performed to assess the conceptual model tended to support the model, albeit with limited data. The model provides a framework for understanding how MSHA activities can influence workers' comfort in exercising their rights. Additional data would help assess the validity of the model. A valid conceptual model would assist MSHA in better understanding how it could improve WRAAK.
- **ERG recommends continued use of the survey instrument.** The survey instrument appears to have performed well based on our review of the submitted surveys. However, an additional round of pre-testing may improve the instrument further.
- **ERG does not recommend continued use of the newspaper advertisement as a viable mode for implementing this type of survey.** In order to improve the consistency of responses and minimize logistics, the advertisement would need to feature a higher profile ad style and placement in order to attract attention and the advertisement should be scheduled on a longer, recurring timeframe to take advantage of bulk pricing and reduce staff time. Even with these revisions, a broader implementation would be very costly. Also, obtaining a random, representative sample with this method is problematic.
- **MSHA should consider modifying its grants program if the agency believes that the data on WRAAK are valuable to its outreach efforts.** The state grantee training program contacts are supportive of the effort; however, they would need to be empowered to incorporate the survey into training in order to avoid conflict with their customers, the mine operators, and to make this data collection approach viable. If MSHA deems collection of these data valuable, then it should consider making collection of these data a part of the grants for the training programs or a part of the training itself.⁹ For example, MSHA could have the survey (or a subset of the survey) be taken as part of the required training. MSHA could also require that grantees administer a certain number of the surveys based on a random selection of training sessions. ERG recognizes, however, that the training grants program has objectives and requirements well beyond the collection of these data. Thus, MSHA would need to balance the needs and requirements of grants program with the value of data on WRAAK.
- **DOL and MSHA should consider the trade-off between collection of any data and collection of representative data.** One goal of this project was to determine if there was a data

⁹ As part of this framework, the survey would need to collect more detailed information on the training and the participants (e.g., union/non-union, size of mine, type of mine, etc.) to develop appropriate sampling weights to extrapolate to the population of miners.

collection mode that could be used to collect representative data from miners. Both of the feasible modes we tested had difficulties in obtaining this goal. However, there may be some methods that would result in collection of data that are not representative, but would nonetheless provide data. For example,¹⁰ MSHA could ask callers to the complaint hotline to take the survey, MSHA could have the survey posted on its website, MSHA could have it advertised in mining publications or newspapers,¹¹ MSHA could have the survey discussed in blogs, or it could even use social media (e.g., Facebook, Twitter) to get the survey into the hands of miners. All of these approaches would generate responses to the survey, but would not result in representative data. However, the data collected may be useful to MSHA in understanding issues it may need to address in its outreach. This approach may also generate some “false” responses from mine operator management. Those responses may not be distinguishable from true miner responses and could create a biased picture of worker WRAAK. On the other hand, under this approach MSHA would be looking for problem areas and responses that indicated issues with WRAAK would be of more interest.¹²

- **Consider offering an incentive.** In conjunction with the previous recommendation, DOL should consider whether offering an incentive for participation. Incentives have been shown to increase survey response rates.¹³ The incentive provided should be small (e.g., worth \$5 or less); a large incentive may appear to the respondent that DOL is “purchasing” a response and the potential respondents may weigh the value of their time against the value of the incentive. Additionally, DOL should avoid offering an incentive that involves collecting identifying information on the respondent for the incentive to be provided (e.g., entering each respondent into a drawing for cash or a valuable item would require the respondent providing DOL with identifying information). As has been discussed, MSHA has expressed concerns about a survey mechanism that is not anonymous. An appropriate incentive may be a \$5 (or less) gift card that the respondent can use to purchase a small item (e.g., part of lunch, a cup of coffee, etc.). Furthermore, the incentive should only be provided for *completed* surveys.
- **DOL and MSHA should take advantage of emerging delivery mechanisms in future data collections.** During the second TWG meeting, the TWG members discussed potential delivery mechanisms that have emerged since the beginning of this project; such as the expansion and maturation of social networking, and the emergence of online training for miners. Social networking could operate in two ways: a conduit for raising awareness of and recruiting respondents to the survey, and as a way to reach out to miner communities. For example, a coal mining focused blog could post a link for the survey and describe how to

¹⁰ MSHA would need OMB approval for distributing surveys in this manner.

¹¹ Above we have not recommended use of the newspaper advertisement for collection of representative data. Here we are suggesting it could be used to collect non-representative data.

¹² Since the data would not be representative, there would be no need to calculate overall measures of WRAAK and the characterize WRAAK in the mining industry.

¹³ Dillman, Don, 2000. *Mail and Internet Surveys: The Tailored Design Method*, Second Edition, John Wiley & Sons, Incorporated.

participate, or provide a space where members of the mining community feel comfortable airing concerns about the mines.

1.0 INTRODUCTION

In 2010, Secretary of Labor Hilda L. Solis made *Good Jobs for Everyone* the strategic vision for DOL, characterizing a good job as one that “...is safe and secure and gives people a *voice* in the workplace”¹⁴ (emphasis added). This strategic vision emerged in a context of increasing emphasis on developing performance measures to track DOL’s progress toward achieving its strategic goals.

From this vision, DOL developed the concept of “Worker’s Rights – Access, Assertion, and Knowledge” (WRAAK) as a way of measuring Secretary Solis’ vision.¹⁵ The purpose of this project was to develop a measure of WRAAK and to pilot test methods for collecting data on WRAAK from miners. DOL recognizes that measuring WRAAK in the mining industry, compared to other sectors, requires a special approach due to factors that set workers in this industry apart from most others:

- **Nature of mining work.** Underground mining is among the most dangerous occupations in the United States, and mines are heavily regulated and frequently inspected. This situation forges close bonds between miners, who rely on each other for safety and productivity; these bonds extend to the full community and involve complex interactions between the miners, the mine operators, and regulators.
- **Complex relations between miners, operators, and regulators.** In many communities, mine operations provide the best paid, albeit the most dangerous, jobs. While miners rely on regulators to enforce safety standards,¹⁶ they also know that such enforcement can have personal economic consequences.
- **Close-knit nature of mining communities.** These communities tend to be reluctant to communicate with outside organizations due in part to concern that such communication could result in new laws, policies, or enforcement actions that interfere with their community.

DOL awarded a task order to Eastern Research Group, Inc. (ERG) and its subcontractor, the National Opinion Research Center at the University of Chicago (NORC), to conduct this study to identify meaningful measures of WRAAK in the coal mining industry.¹⁷ As part of this study, ERG pilot tested data collection methods to determine how best to ask coal miners about their access, assertion, and knowledge of their rights. The primary research question for this study was (see the Statement of Work (SOW) in Appendix A):

¹⁴ Testimony of Secretary of Labor Hilda L. Solis before the Subcommittee on Labor, Health and Human Services, Education and Related Agencies Committee on Appropriations, U.S. House of Representatives, March 10, 2010. http://www.dol.gov/sec/media/congress/20100310_appropriations.htm

¹⁵ During the study, DOL shifted from the use of the term “voice in the workplace” to “Worker’s Rights – Access, Assertion, and Knowledge” to better communicate the focus of the DOL initiative compared to the description of voice in the literature. The academic literature on voice in the workplace focuses on the ability of an employee to speak up about any issue in the workplace; the DOL initiative, on the other hand, focuses on the ability of the worker to act on issues related to their rights.

¹⁶ Nevertheless, responsibility for compliance with safety and health standards is the responsibility of the mine operators first and foremost.

¹⁷ DOL and ERG agreed to limit the scope of the study to coal mining, rather than also including the metal/non-metal sectors.

What measures of WRAAK and perceived non-compliance, combined with what modes of data collection could be best used to track MSHA's worker protection outreach activity?

DOL directed ERG to perform this as a *pilot project*, focusing on (1) developing a measure of WRAAK, (2) developing a survey instrument to collect data on WRAAK, and (3) assessing the feasibility of different data collection modes. At the outset, DOL and ERG agreed that development of a statistical sampling plan for collecting representative data and collecting a large number of responses was out of scope for the project. This report provides the outcomes from this pilot study. As such, the data presented in this report should not be considered representative of the population we focused on (coal miners). Rather, the focus is on reporting on the measure of WRAAK that was developed and its associated survey instrument and the effort that were undertaken to test feasible data collection modes.

2.0 STUDY PARAMETERS AND TIMELINE

This section describes ERG’s approach to performing the study including scope and definitions and a description of the timeline of the project work. The original design report is presented in Appendix B.

2.1 SCOPE AND DEFINITIONS

In its SOW (see Appendix A) for this project, DOL established the preliminary project scope and key definitions. During a Technical Meeting between ERG and DOL on November 18, 2010, DOL refined and clarified certain aspects of the project scope and definitions:

- DOL definition of WRAAK (formerly “Voice in the Workplace”).** DOL’s working definition of WRAAK is: *Workers’ ability to access information on their rights in the workplace, their understanding of those rights, and their ability to exercise these rights without fear of discrimination or retaliation.* This definition narrows the traditional academic interpretations of “voice” from action on any workplace issue (e.g., “speaking up”) to focus specifically on actions related to exercising key workplace rights, such as filing a hazardous condition complaint or identifying the existence of hazards to management.
- Focus on coal miners.** DOL and ERG agreed to concentrate this initial pilot project work on coal mining operations and to exclude metal/non-metal mining operations at this point.
- Focus on safety and health.** DOL and ERG agreed to focus on coal miners’ WRAAK with respect to safety and health regulations under the jurisdiction of the Mine Safety and Health Administration (MSHA). The project did not consider issues under the jurisdiction of other government departments and agencies.
- Pilot nature of the study.** This study was also a pilot test of feasible approaches to measuring WRAAK in coal mining workplaces. Thus, it represents a first step toward the ability to collect nationally representative data. As a pilot test, this study was not intended to generate nationally representative data or sufficient data to permit statistically valid stratification (e.g., by type of mine, operator, or workplace). The ultimate purpose is to determine whether a measure of WRAAK can be defined for this population (miners) and whether there is a mode of data collection that could be feasible in this population.

DOL definition of WRAAK:

Workers’ ability to access information on their rights in the workplace, their understanding of those rights, and their ability to exercise these rights without fear of discrimination or retaliation.

2.2 TIMELINE AND PROJECT WORK

The approach ERG took to answering the research question is illustrated in Figure 1. After defining the scope decisions, conducting a targeted literature review, and having discussions with DOL

staff, ERG developed a conceptual model of WRAAK in mining workplaces that highlights the core relationships between the concepts that influence it. Using this model as a foundation, ERG developed – in parallel – measures of WRAAK in mining workplaces and a set of potential data collection modes.

After defining a set of measures for the concepts that constitute WRAAK, ERG designed a draft survey instrument that provided the data needed to develop the measures. The initial version of the survey was formatted as a paper survey that could be easily adapted to an in-person interview for cognitive testing. ERG performed a set of cognitive testing interviews with coal miners to determine if the format and wording of the instrument were suitable and to identify appropriate revisions to the survey.

ERG developed a list of potential data collection modes that could be used for the pilot test, and then compared the relative advantages and disadvantages of each mode in order to eliminate infeasible ones prior to pilot testing.¹⁸

At this point in the project, ERG received detailed, insightful feedback from a Technical Working Group (TWG) composed of experts in measuring voice in the workplace, research design, the mining industry, and occupational safety and health. The TWG members included:

- John Budd, Professor of Industrial Relations, University of Minnesota
- Larry Grayson, Professor of Energy and Mineral Engineering, College of Earth and Mineral Sciences, Penn State
- Pauline Kim, Professor of Law, Washington University
- Nancy Lessin, Program Coordinator, United Steelworkers - Tony Mazzocchi Center
- Alison Morantz, Professor of Law & John A. Wilson Distinguished Faculty Scholar, Stanford Law School

TWG members provided ERG with feedback and suggestions on the draft data collection modes and draft survey instruments during an in-person meeting in Washington, D.C. on August 24, 2011. This process resulted in the selection of two data collection modes to be used in the pilot testing:

- ***Paper surveys distributed through state grantee training sessions.*** ERG would distribute survey packets (including the survey instrument, FAQs, and a self-addressed stamped envelope) to instructors of state grantee funded mine safety and health training courses who would distribute the survey to their trainees.
- ***Online or phone survey with recruitment through newspaper advertisements.*** Information about the survey would be distributed through advertisements in local newspapers. Miners interested in responding could call the toll-free phone number or visit the website to participate.

The next step was to format the survey instruments and draft a written response to the OMB supplemental questions for applications for approval of an Information Collection Request (ICR) under the Paperwork Reduction Act (PRA). ERG drafted a 60-day notice to collect public comments on the planned information collection; the notice was published in the Federal Register on January 19, 2012.

¹⁸ The full set of implementation modes considered for this project is discussed in Section 4.1.

ERG created three versions of the survey: a self-administered version to be distributed as a paper survey, a phone survey script with detailed instructions for phone interviewers to collect and code responses, and a mock-up of a web-based survey instrument. These instruments, plus the responses to the OMB supplemental questions, a copy of the 60 day Federal Register Notice, and responses to public comments formed the complete OMB package (see Appendix C). ERG submitted this package to DOL for internal departmental review. ERG then incorporated feedback from DOL, who submitted the data collection approach to OMB for review on June 6, 2012.

After six months of review, comment, and revision; ERG was notified of OMB approval on January 10, 2013 and began preparing to implement the pilot data collection. Unfortunately, the date of OMB approval was well beyond when ERG had anticipated OMB approval and necessitated the need for extension of ERG's contract with DOL. DOL did, in fact, extend ERG's contract, but the extension was granted only through April 23, 2013. This meant that ERG had three and half months from time of OMB approval to contract end to collect data, write a draft report, hold a second TWG meeting, and submit a final report. This tight schedule meant ERG had limited time to collect data under this project.

Prior to OMB approval, ERG coded the web-based instrument, developed an advertisement, and contacted newspapers and state training grantees. Upon OMB approval, ERG began scheduling site visits and survey distribution with state training grantees in several states and worked with several local newspapers to schedule newspaper advertisements. The outcomes of the pilot implementation of the data collection modes is described in Section 4, with a summary of the data collected in Section 5.

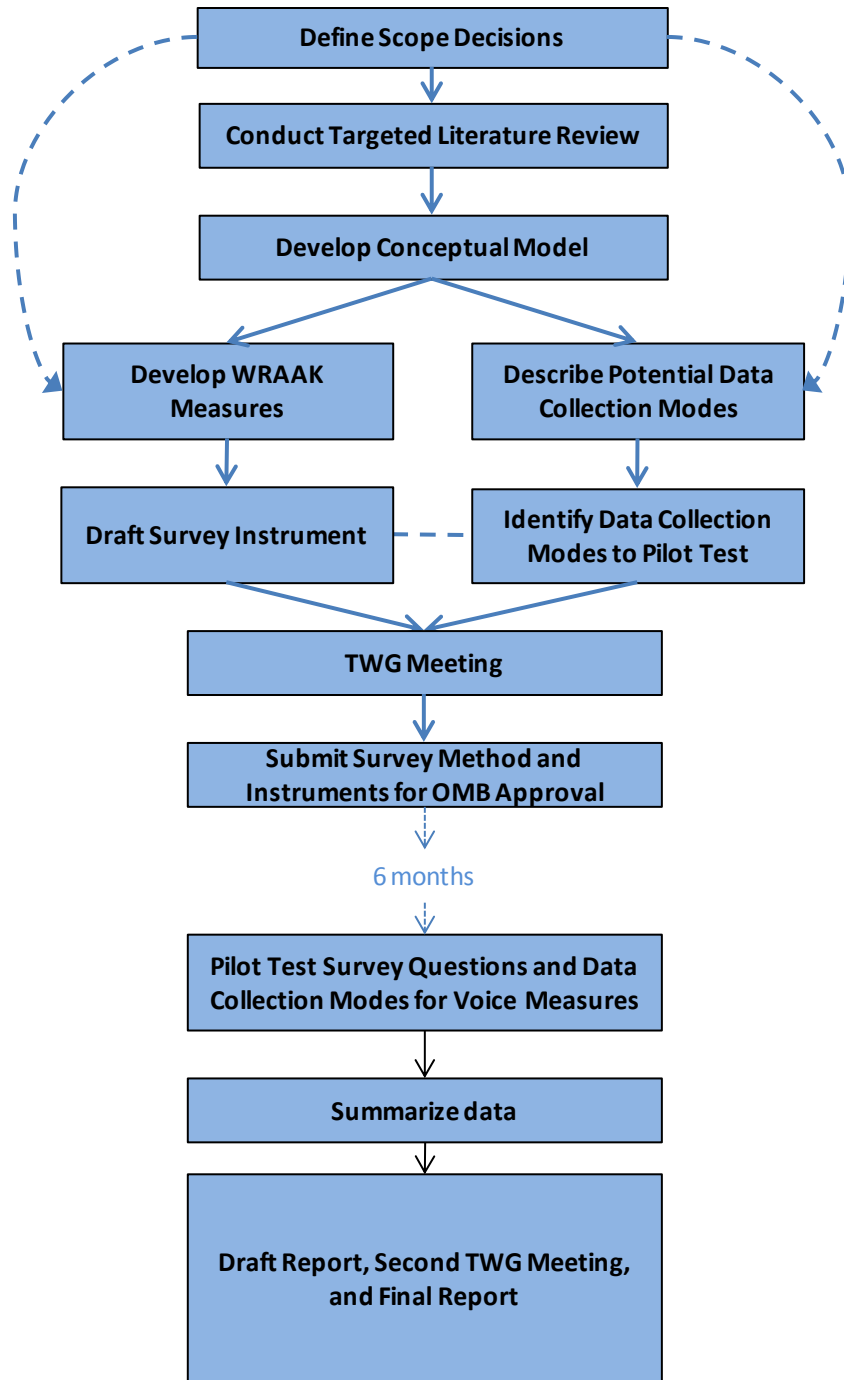


Figure 1 – Project Path

3.0 MEASURING WRAAK IN THE MINING WORKPLACE

This section describes the development of the measures of WRAAK beginning with a targeted literature review and the development of the conceptual model applied to development of survey instrument.

3.1 TARGETED LITERATURE REVIEW

ERG's literature review focused on studies that are directly relevant to developing a measure of WRAAK in the mining industry relevant to DOL's definition. In discussions with ERG, DOL's Chief Evaluator identified several behaviors and characteristics that WRAAK comprises: worker awareness, access to information, knowledge, empowerment, actions, and outcomes. DOL also suggested that this study might require exploration of innovative measures and uncommon data collection approaches. To conduct the literature review, therefore, ERG identified studies from academic, peer-reviewed sources that:

- Provided a concise overview of key conceptualizations of voice.
- Focused on voice in the mining industry.
- Demonstrated or suggested an approach to measuring employee voice behaviors.
- Examined the role of various voice mechanisms in the workplace.
- Assessed the importance of factors that influence the exercise of voice by employees.

Much of the research that is relevant to DOL's definition of WRAAK derives from Albert O. Hirschman's 1970 book *Exit, Voice, and Loyalty: Responses to decline in firms, organizations, and states*.¹⁹ This book established a general framework for understanding people's varied responses to a deteriorating situation in a group to which they belong. The framework has been used to explain consumer responses to declining product quality, employee behavior in difficult workplaces, and participation in national politics. In the area of worker behaviors, Hirschman and subsequent researchers have theorized that workers respond to workplace problems in four ways:

- **Exit** – leave the organization.
- **Voice** – speak up or voice concerns to individuals in the organization with the authority to resolve the problem.
- **Loyalty** – remain loyal to the organization in the hope that the problem will be resolved. Loyalty is not a separate action; rather, it moderates the individual's choice between exit and voice.

¹⁹ Hirschman, Albert O. 1970. *Exit, Voice, and Loyalty: Responses to decline in firms, organizations, and states*. Harvard University Press, Cambridge, Massachusetts.

- **Neglect** (Rusbult et al., 1982)²⁰ – passively allow the situation to continue to deteriorate; like loyalty, neglect influences whether or when the individual uses exit or voice.

Although very little published literature pertains directly to voice in the mining industry, four key findings from ERG’s literature review and discussions with DOL do help support development of a conceptual model and measures of voice for mining workplaces (see Table 1).

Table 1 – Key Findings from Literature Review and Discussions with DOL

Key Finding	Implications for Conceptual Model / Measures of WRAAK
<p>Most researchers use one of four approaches to measure voice in the workplace:</p> <ul style="list-style-type: none"> • Track formal complaints filed by workers. • Observe the presence or absence of specific voice mechanisms. • Qualitatively analyze interviewee responses to questions on voice behaviors. • Develop and implement scales for measuring voice through a survey questionnaire. 	<p>Each of these approaches has advantages and disadvantages. For example:</p> <ul style="list-style-type: none"> • Data on formal complaints are readily available from regulatory agencies, but complaints do not correlate well with underlying worker protection violations or with informal voice mechanisms. • Voice mechanisms can be defined and measured in a questionnaire, but the presence of voice mechanisms does not guarantee their use by workers. • Interviews produce nuanced information on the context behind voice behaviors, but performing in-person interviews is time-consuming and resource-intensive. Obtaining statistically representative data by this method is problematic. • Scales produce consistent data that can be tracked over time; development of a good scale requires thorough pre-testing and validation. <p>A rigorous approach to measuring voice in the workplace can be developed by crafting scales relating to voice behaviors to address a broad set of voice mechanisms ranging from informal (e.g., speaking to a coworker) to formal (e.g., union-sponsored dispute resolution, formal complaints about violations). Administering a survey instrument during in-person interviews might generate good information about voice; pilot testing such an approach could assist in refinement of voice measures and instruments for larger scale measurement.</p>
<p>In many industries, unions function as a key voice mechanism because they act as a direct conduit for grievance resolution and support the development of other voice mechanisms in the workplace.</p> <p>In the studies that ERG reviewed, unionization and the number of voice mechanisms appear to be correlated with employer size.</p>	<p>In the mining industry, worker voice might also be correlated with unionization and size of operation. As a result, any method of measuring worker voice in the mining industry should be representative of (and/or stratified by) union status and operation size when fully implemented.</p>

²⁰ In 1982, Rusbult et al. added neglect to Hirschman’s framework to explain responses to decline in romantic relationships. Neglect has since been treated as an integral part of the framework. (See Rusbult, Caryl E., Isabella M. Zembrodt, and Lawanna K. Gunn, 1982. “Exit, Voice, Loyalty, and Neglect: Responses to Dissatisfaction in Romantic Involvements,” *Journal of Personality and Social Psychology*, vol. 43, no. 6.)

Key Finding	Implications for Conceptual Model / Measures of WRAAK
<p>Factors that tend to discourage miners from exercising voice include</p> <ul style="list-style-type: none"> • High exit costs, as employment alternatives in mining towns tend to be limited. • A perceived or real risk of retaliation, including termination. 	<p>The classic model of voice in the workplace predicts that workers will choose voice when loyalty is high and exit is costly. In the mining industry, however, the risk of retaliation (including termination) can make exercise of voice risky, even when loyalty is high. As a result, some miners choose neglect instead.</p> <p>A strong method for measuring voice in mining workplaces should track miners' beliefs about the likely outcomes of exercising voice (e.g., positive change, no change, retaliation), in order to help DOL determine whether a mine has few complaints because there are few issues to complain about or because miners fear the consequences of exercising voice.</p>
<p>Factors that tend to encourage miners to exercise voice include:</p> <ul style="list-style-type: none"> • Worker knowledge and understanding of rights. • Quality of organizational leadership. • Perceived top management openness. • Perceived supervisor receptivity. • Worker trust in supervisor. • Worker self-monitoring. • Severity of workplace problem. 	<p>ERG's conceptual model illustrates the role these factors play in supporting workers exercising their rights (or, if absent, discouraging exercising rights).</p> <p>Any approach to collecting data from miners should take into account that these workers will likely be more comfortable responding to questions if they are confident that the risk of participation is low.</p>

3.2 CONCEPTUAL MODEL OF WRAAK

To characterize conditions that lead to workers having a voice in their workplace, as well as to help guide development of survey questions, ERG developed a simplified conceptual model for WRAAK in mining workplaces (see Figure 2). ERG developed this model based on:

- DOL's definition of WRAAK: *Workers' ability to access information on their rights in the workplace, their understanding of those rights, and their ability to exercise these rights without fear of discrimination or retaliation.*
- The results of our literature review (see Section 3.1).
- Discussions with DOL yielding a list of behaviors and characteristics that worker WRAAK likely comprises: worker awareness, access to information, knowledge, empowerment, action, and outcome.
- Our conceptualization of WRAAK that encompasses DOL's definition and related behaviors and characteristics: workers' sense of empowerment to express concerns about rights violations to either mine management or to MSHA. (That is, an empowered worker feels comfortable to assert his/her rights.)
- Feedback and suggestions from the first TWG meeting.

At a high level, the model posits that **knowledge** leads to employees feeling comfortable in exercising their rights (**WRAAK**), which in turn leads to **action** and ultimately an **outcome**; this process is influenced by contextual factors. We decomposed **knowledge** into two discrete concepts:

- **Awareness, access, and use** [of materials]—the extent to which workers are aware of and have access to materials that contain information related to their rights, and the extent to which workers use the materials that contain information on their rights.
- **Understanding**—the extent to which workers understand their rights.

In short, knowledge develops initially through workers being aware, having access to and using materials with information on their rights; ideally leading to an understanding of their rights. With this knowledge, workers feel a sense of empowerment to exercise their rights, which leads to action. We also decomposed **action** into two concepts:

- **Willingness to act**—the extent to which workers are willing to take action.
- **Acting**—the actions that a worker takes.

The result of the action is an **outcome**:

- **Positive outcome**—such as the correction of a safety and health hazard or management recognition of safety behavior.
- **Negative outcome**—such as reassigning the worker to a less desirable position or shift or loss of a productivity bonus.

As noted by the TWG members, miners are aware of the potential positive and negative outcomes of exercising their rights and this will play an important role in when and how their rights are asserted. The outcomes feed into workers' sense of empowerment, with positive outcomes having a positive influence on empowerment, and negative outcomes having a negative influence. The entire process is influenced by **context**:

- **Work environment**—characteristics of the miners' work environment (e.g., supervisor receptivity to voice).
- **Community**—characteristics of the miner's community (e.g., availability of local support organizations).
- **Regulatory**—MSHA outreach initiatives (e.g., MSHA's Guide to Miners' Rights and Responsibilities, the Rights "Small Card"), inspections, and enforcement.
- **Miners' demographics and/or personality traits**— demographic characteristics and personality traits (e.g., trust, loyalty, union membership status, length of tenure in mining).

In this conceptual model, WRAAK is a latent variable: it cannot be directly observed, but can be inferred through the other concepts in the model. Those concepts can be operationalized into survey questions.

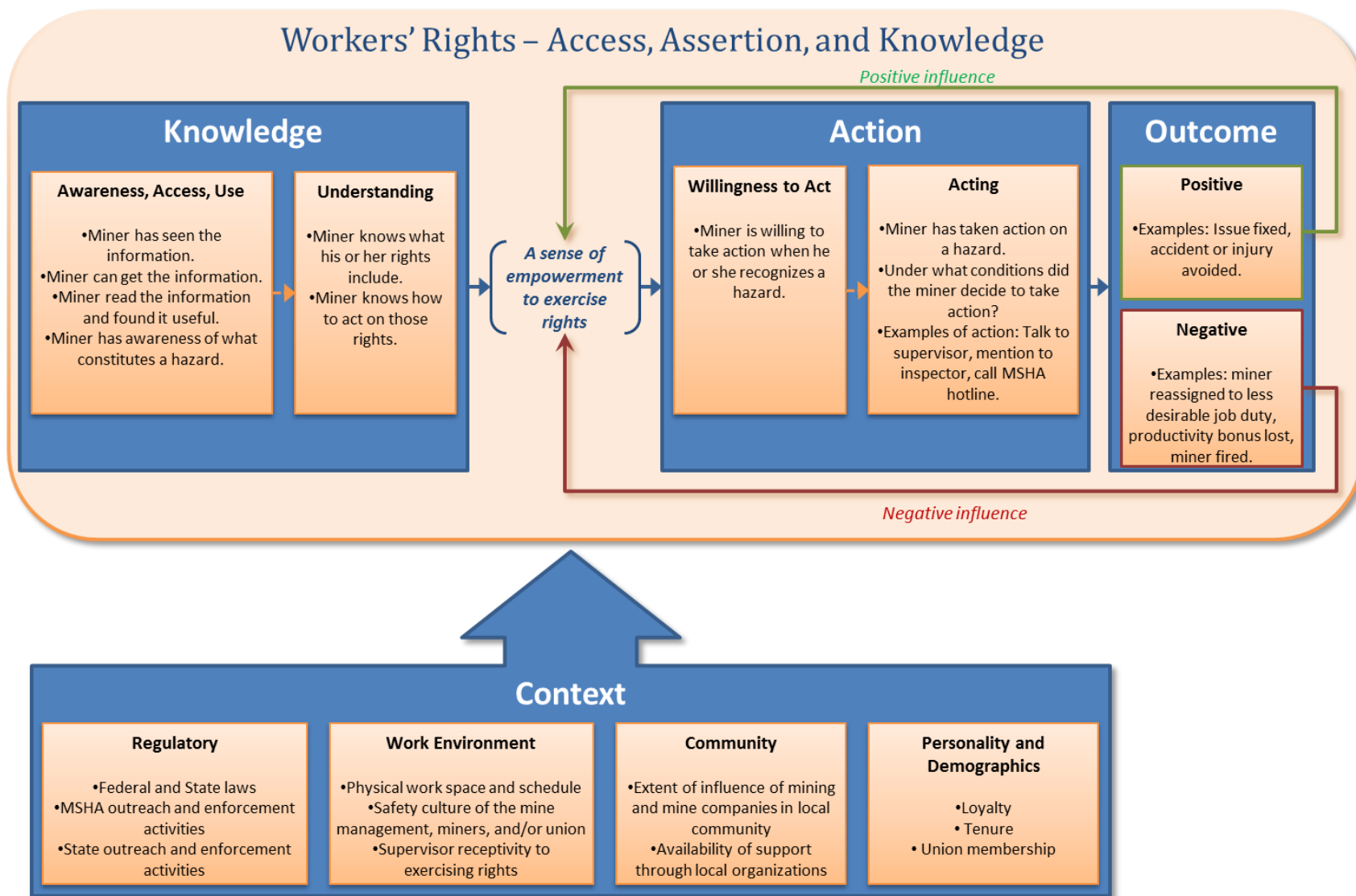


Figure 2 – Conceptual Model of WRAAK in the Workplace.

3.3 SURVEY INSTRUMENT

In this section we discuss the development of survey questions that could be used to construct the measures of WRAAK and the preparation and testing of the survey instruments.

Survey Instrument and Questions

To develop the draft survey instrument, ERG began by reviewing instruments that were drafted for measuring WRAAK related to OSHA and WHD regulations—to ensure that our survey instrument was as consistent with those as possible. We then developed questions that reflect the concepts depicted in our conceptual model. Aside from screening and demographic questions, the three main types of questions are:

- Agreement scale questions—ask the respondent to rate the degree to which they agree with a statement, using a five-point scale:
 - Strongly agree
 - Agree
 - Neutral
 - Disagree
 - Strongly disagree
- Yes/no questions—ask the respondent to answer yes or no (and, where appropriate, “not sure/don’t know”).
- List questions—ask the respondents to choose one or more options from a list of choices.

Additionally, in response to TWG comments during the first working group meeting we added a short set of questions about miner experience with and reporting of mining-related injury or illness. In drafting this set of questions, as well as a set of questions on reporting hazards, we followed the convention in survey question design of establishing a frame of reference for the respondent in the question stem.²¹ For example, we asked respondents about the actions they took “the last time” they saw a safety hazard. The advantage of this type of question construction is that it establishes a common reference period across respondents, which is important for testing the survey instrument and conceptual model; the disadvantage is that the “last” safety hazard or injury might have been relatively minor, so the question may miss information about more significant events.

Using Survey Questions to Define and Measure the WRAAK Concepts

Table 2 provides a cross-walk between ERG’s draft survey questions and the WRAAK concepts from our conceptual model; each voice concept is associated with several survey questions. In order to generate a measure for each concept, the responses to that set of questions could be analyzed together. For a full scale implementation with sufficient data collected, a researcher could assign numeric values to response options and sum the responses for each set of questions representing a WRAAK concept or

²¹ Tourangeau, Roger, Lance J. Rips, and Kenneth Rasinski, 2000. *The Psychology of Survey Response*, Cambridge University Press, First Edition.

measure. Due to the small number of responses to the survey, we did not perform this type of analysis on the data collected.

Cognitive Testing and Refinement of Survey Questions for Pilot Testing

Before submitting the draft survey for approval through the OMB Paperwork Reduction Act (PRA) Information Collection Request (ICR) clearance process, ERG conducted cognitive testing²² to obtain feedback on the instrument from miners (and inspectors).

ERG recruited nine coal miners working in underground mines (both union and non-union) to participate in testing of the survey instrument; each received a \$50 incentive.²³ Although statistical significance is not a goal of cognitive testing, we attempted to include miners of various ages, union status, and employer size, as well as geographic location in order to capture a broad range of perspectives. In conducting the cognitive testing, we assured subjects of their privacy, explained the purpose of the survey, and conducted the interview. The cognitive testing team used a script that was approved by NORC's Institutional Review Board (IRB) to ask subjects for their reactions to the survey. Interview questions addressed the extent to which the subject: felt comfortable answering the questions as written, believed the questions and response options were easy to understand (used language and concepts that "feel right" to miners), meaningful, appropriate, and complete. In response to the findings from the cognitive interviews ERG made several revisions to the survey instrument to clarify and streamline instructions, refine response options, and simplify wording. NORC's report on the cognitive testing along with the cognitive testing script and the version of the instrument used in the cognitive tests appears in Appendix D of this report.

Table 2 – Cross Walk Between WRAAK Concepts and Survey Questions

Q #	Question text	Response type
Awareness, access, and use: the extent to which workers are aware of, have access to, and use materials that contain information related to their rights.		
5.	I can tell my mine management about a safety concern using our: (check all that apply): [Response options]	List
6.	My mine management gives me information about my mine safety rights by (check all that apply): [Response options]	List
7a.	I know where to get information about my mine safety rights.	Agreement
7b.	I know enough about the Mine Act to recognize a violation when it happens.	Agreement

²² Cognitive testing involves interviewing potential respondents to elicit their reactions to the draft survey instrument. These cognitive interviews should not be confused with face-to-face, interview-style implementation of a survey (an implementation mode evaluated as part of this project).

²³ It is standard practice to offer an incentive for cognitive interviewees to compensate the individual for his/her time since cognitive interviews take more time than simply answering a survey and to ensure an appropriate level of recruitment (see Willis, Gordon B., 2005. *Cognitive Interviewing: A Tool for Improving Questionnaire Design*, Sage Publications, page 144). The amount offered under this project was deemed appropriate by ERG's subcontractor, NORC, based on past experience.

Table 2 – Cross Walk Between WRAAK Concepts and Survey Questions

Q #	Question text	Response type
8.	If I wanted to learn more about my mine safety rights, I would:	
8a.	Ask a coworker.	Agreement
8b.	Ask my supervisor.	Agreement
8c.	Ask someone in mine management.	Agreement
8d.	Ask the safety committee.	Agreement
8e.	Ask someone at the mine office.	Agreement
8f.	Ask a miners' representative.	Agreement
8g.	Ask a union representative.	Agreement
8h.	Read a brochure or poster at my mine. ,	Agreement
8i.	Visit the MSHA website (www.msha.gov).	Agreement
	A Guide to Miners' Rights and Responsibilities under the Federal Mine Safety and Health Act of 1977 (brochure).	
9.	Have you seen it?	Yes/No
10.	Have you read it?	Yes/No
11.	Would you recommend it?	Yes/No
12. – 14.	Miners' Rights (trifold pamphlet) (<i>as above</i>)	Yes/No
15. – 17.	Miners' Rights (small card) (<i>as above</i>)	Yes/No
18. – 20.	"One Call Does it All" (Telephone Hotline) (<i>as above</i>)	Yes/No
21. – 23.	MSHA.gov (Website) (<i>as above</i>)	Yes/No
24. – 25.	Miners Rights (Poster) (<i>as above</i>)	Yes/No
Understanding: the extent to which workers understand their rights.		
27.	Before taking this survey, I was fully aware that I have the legal right to:	
27a.	Make a complaint about a possible danger or safety violation to my mine management.	Yes/no
27b.	Tell MSHA or a state agency about a possible safety hazard.	Yes/no
27c.	Choose a safety representative to participate in all aspects of a mine inspection.	Yes/no
27d.	Get an X-ray for signs of Black Lung, paid for by my employer.	Yes/no
27e.	Ask to transfer to a less dusty job if I am diagnosed with Black Lung.	Yes/no
27f.	Refuse to operate equipment I am not trained to use, and tell my supervisor.	Yes/no
27g.	Refuse to work in conditions I believe to be unsafe.	Yes/no
27h.	Complain to MSHA if I have been retaliated against for exercising my rights under the Mine Act.	Yes/no
Willingness to act: the extent to which workers are willing to take action.		
28.	At my mine, I would feel comfortable:	
28a.	Making a complaint about a possible danger or safety violation -- to my mine management.	Agreement
28b.	Telling MSHA or a state agency about a possible safety hazard.	Agreement

Table 2 – Cross Walk Between WRAAK Concepts and Survey Questions

Q #	Question text	Response type
28c.	Choosing a representative to participate in all aspects of a mine inspection.	Agreement
28d.	Getting an X-ray for signs of Black Lung, paid for by my employer.	Agreement
28e.	Asking for a transfer to a less dusty job if I am diagnosed with Black Lung.	Agreement
28f.	Refusing to operate equipment I am not trained to use, and telling my supervisor.	Agreement
28g.	Refusing to work in conditions I believe to be unsafe.	Agreement
28h.	Complaining to MSHA if I have been retaliated against for exercising my rights under the Mine Act.	Agreement
29.	If I saw a safety hazard, I would:	
29a.	Fix the hazard myself.	Agreement
29b.	Tell someone outside the mine.	Agreement
29c.	Tell a coworker.	Agreement
29d.	Tell a union representative.	Agreement
29e.	Tell a miners' representative.	Agreement
29f.	Tell my supervisor.	Agreement
29g.	Tell the mine inspector next time they come to the mine.	Agreement
29h.	Call MSHA's hotline.	Agreement
29i.	Call MSHA's field or district office.	Agreement
29j.	Tell a state agency.	Agreement
29k.	Not say anything.	Agreement
29l.	Do something else (<i>please specify</i>):	Verbatim
Acting: the actual actions that a worker takes.		
30.	The last time I saw a safety hazard, I told someone at my mine or a federal or state agency:	Yes/no
31.	I did not tell anyone about the safety hazard because (<i>check all that apply</i>): (<i>Response options</i>)	List
32.	I told (<i>check all that apply</i>): (<i>Response options</i>)	List
39.	In the past two years, I had at least one mining-related injury or illness that needed medical attention beyond first aid.	Yes/no
40.	I told my mine management about the <i>last</i> injury or illness I had that needed medical attention.	Yes/no
41.	I did not report the injury or illness because I did not want to: (<i>check all that apply</i>) (<i>Response options</i>)	List
Outcome: The outcome of taking action.		
33.	After I reported the hazard (<i>check all that apply</i>): (<i>Response options</i>)	List
34.	After I reported the hazard, I felt some negative reaction from my coworkers.	Yes/no
35.	The negative reaction from my coworkers included (<i>check all that apply</i>): (<i>Response options</i>)	List
36.	After I reported this hazard, I felt some negative reaction from management.	Yes/no

Table 2 – Cross Walk Between WRAAK Concepts and Survey Questions

Q #	Question text	Response type
37.	The negative reaction from management included (<i>check all that apply</i>): (<i>Response options</i>)	List
Work environment: characteristics of the miner’s work environment and community that influence knowledge, voice, or action (e.g., supervisor receptivity to voice).		
1.	I work in a union mine	Yes/no
2.	I belong to a union.	Yes/no
3.	I belonged to a union within the last two years.	Yes/no
4.	Please tell us how much you agree with these statements:	
4a.	I trust my mine management to provide a safe workplace.	Agreement
4b.	My mine is a safe mine.	Agreement
4c.	If I point out a safety hazard, my mine management fixes the problem.	Agreement
4d.	I can point out a safety hazard without worrying about the consequences.	Agreement
4e.	If I could, I would leave my job to work at a different mine.	Agreement
42.	How <i>free</i> do you feel to exercise your rights in your mine without fear of retaliation?	Not at all/ Extremely
Regulatory: MSHA outreach initiatives, inspections, and enforcement activities.		
9 to 26	[Various questions about MSHA outreach materials.]	Yes/no
38.	I trust MSHA to:	
38a	Stand up for my rights as a miner.	Agreement
38b	Keep what I tell them confidential (not tell my employer)	Agreement
Demographics: demographic characteristics that influence knowledge, voice, or action.		
43-55	Various demographic questions.	Various

4.0 PILOT DATA COLLECTION METHODS

This section describes the data collection modes that were considered, the steps we took to implement each selected collection mode, and provides a summary of the number of survey responses obtained from each. As noted in Section 2.2, two data collection modes were selected:

- **Paper Survey distributed through state grantee training sessions.** ERG distributed survey packets (including the survey instrument, FAQs, and a self-addressed stamped envelope) to instructors of state grantee funded mine safety and health training courses who would distribute the survey to their trainees.
- **Online or phone survey with recruitment through newspaper advertisements.** Information about the survey was distributed through advertisements in local newspapers. Miners interested in responding could call the toll-free phone number or visit the website to participate.

4.1 SELECTION OF DATA COLLECTION MODES TO PILOT TEST

A key challenge of this project was to identify feasible survey delivery mechanisms, in other words, to find a reliable way to get the survey in front of a coal miner. ERG, with input from DOL, MSHA, and the TWG, researched traditional and alternative approaches to delivering the survey to miners. We compared the potential data collection approaches on several criteria: need for and availability of a sample frame, likelihood of non-response issues, relative cost, complexity of implementation logistics, feasibility of scaling up from pilot to full-scale, and the likelihood that the full-scale implementation could be designed to provide a random, representative selection of respondents.

Overall, ERG examined nine data collection modes for suitability for the pilot test. The modes and the reasons for accepting or rejecting them for the pilot test follow.

- **Hazardous Condition Complaint hotline data** – This approach would have asked callers to the hotline if they were willing to do the survey. MSHA expressed concerns about use of this method, additionally the sample would not be representative and the sensitivity of the topic in the context of a hazardous condition complaint would likely result in high non-response.
- **Paper survey** – Deliver paper survey instrument to miners through the mail. This mode is scalable and could produce a representative sample but it could not be implemented due to lack of lists of coal miner addresses available for use by this type of project.
- **Phone survey** – Deliver survey instrument through telephone interviews with miners. This mode is relatively inexpensive and easily scalable for representative results but could not be implemented due to lack of lists of coal miner phone numbers; additionally, random digit dialing was rejected due to the low incidence (less than 10 percent) of coal miners even within counties with high coal mining employment.

- **Online survey** – Administer survey instrument to coal miners via a password-protected website. While this mode offers the advantage of cost effectiveness, and scalability, high levels of anonymity for respondents (which would reduce non-response); it could not be implemented due to lack of lists of coal miner email addresses and concerns about access and use of internet resources in coal mining areas.
- **Phone and online survey through the regulatory structure** – During the first TWG meeting, the TWG recommended that we consider an approach to deliver information about the survey (e.g., toll free phone number, web site) through MSHA inspectors during regular mine inspections. This approach was not implemented due to concerns about creating an undue burden on inspectors, high likelihood of non-response and non-representative response, and impracticality of scaling up.
- **Face-to-face intercept survey** – Recruit and train interviewers to approach potential respondents at an event or location where miners tend to congregate, ask them to participate, and administer the survey instrument as an interview. While this mode has the advantage of using local people as interviewers who the respondents may be more comfortable with, it still poses issues of non-response, higher relative cost per response, and infeasibility of scaling up to the national level.
- **Face-to-face survey by recruitment** – The SOW recommended considering an approach to recruit and train local residents to administer the survey instrument to miners during face-to-face interviews. The local resident would recruit miners to participate and schedule the interviews at a later time. Scheduling the interview for a later time in a neutral location improves respondent anonymity, but this mode still faces the challenges of higher relative cost per response and increasing logistic complexity and cost if scaled up.
- **Phone and online survey with advertisement recruitment** – Recruit miners to participate in a phone or online survey through advertisements in the local newspaper. This method was chosen for pilot testing because it can preserve respondent anonymity, does not rely on pre-existing lists of miners, is potentially scalable, and could collect representative data with a sufficient response rate. However, the TWG, ERG, and DOL all acknowledged that this approach may generate selective data.
- **Paper survey implemented through state grantee training courses** – Deliver paper survey instrument to coal miners attending state grantee organized mine safety training sessions.²⁴ This method was chosen for pilot testing because the survey can be distributed to a group of miners by a trusted individual, it is relatively inexpensive, and could be scaled up and designed to provide a representative selection of miners.

²⁴ We expect that for some sessions, attendance was mandatory for miners and for others it was not; this is decided by the mine operator. However, the Mine Act requires operators to provide annual refresher training for all miners.

4.2 PHONE AND ONLINE SURVEY: ADVERTISEMENT RECRUITMENT

After performing additional research into media outlets in the target markets, ERG and DOL determined that running an advertisement in local newspapers would be a better option than using a radio advertisement. The coal miners would most often see the newspaper with the ad in the privacy of their homes, where they could call the toll-free number or access the web-based survey anonymously. This enhances privacy and allows the respondent to act on their interest in the survey immediately rather than relying on recall of the information presented in a radio ad. This section describes this implementation and summarizes the results of the survey.

Implementation

Based on feedback from the TWG, MSHA, and DOL, the recruitment through newspaper advertisements focused on the West Virginia, Eastern Kentucky, and Pennsylvania markets. We identified three newspapers with distribution in areas with high numbers of coal mining employees:

- ***The Charleston Gazette (WV)***. Located in Charleston, WV, this newspaper has a circulation of 60,000 to 70,000 across most of the state. The Gazette also regularly runs coal features and the website features a coal mining blog.²⁵
- ***The Washington Observer-Reporter (PA)***. Located in Washington, PA, the distribution area includes Washington and Greene Counties which have a combined total of 3,980 to 5,479 coal mining employees.²⁶
- ***The Uniontown Herald-Standard (PA)***. Located in Uniontown, PA, the distribution is centered in Fayette County (about 160 coal employees), with slight overlap into Greene (2,980 coal employees) and Somerset counties (1,005 coal employees).²⁷

ERG worked with advertising representatives at each newspaper to schedule an approximately two by four inch black and white advertisement to run in the classified section for four days (two Sundays and the Tuesday and Thursday between). Figure 3 shows the general format of the advertisement, the actual advertisements that appeared in the newspapers varied slightly from this format in order to fit the individual newspaper format requirements.

²⁵ Coal Tattoo, <http://blogs.wvgazette.com/coaltattoo/>

²⁶ U.S. Census Bureau, 2010 County Business Patterns.

²⁷ U.S. Census Bureau, 2010 County Business Patterns.

Figure 3 – Newspaper Advertisement



Each newspaper sets different requirements for setting up an advertisement so the ad did not run at the same time in each newspaper. The ad ran on the following dates in each newspaper:

- **The Charleston Gazette (WV).** 2/17, 2/19, 2/21, 2/24; and, the Coal feature section on 3/3.
- **The Washington Observer-Reporter (PA).** 2/24, 2/26, 2/28, and 3/3.
- **The Uniontown Herald-Standard (PA).** 2/24, 2/26, 2/28, and 3/3.

Survey Results

ERG used two different URLs to track responses to the ads by state; respondents to the Charleston Gazette ad used the URL www.minersurvey.com, while respondents to the two ads running in Pennsylvania used the URL www.minersurvey1.com. We received a total of 29 responses through the web-based instrument; Table 3 summarizes the responses by date, ad activity, and state. Additionally, ERG received eight calls through the toll-free phone number from respondents who requested that a paper copy of the survey be mailed to them; five of these were returned.

Table 3 – Distribution of Survey Responses Received by Date from Newspaper Recruitment

Date	W. Virginia		Pennsylvania	
	Ad Active	Total Responses	Ads Active	Total Responses
February 17	Y	7		0
February 18		8		0
February 19	Y	11		0
February 20		12		0
February 21	Y	12		0
February 22		13		0
February 23		13		0
February 24	Y	19	Y	0
February 25		19		0
February 26		21	Y	0
February 27		22		2

February 28		22	Y	3
March 1		22		3
March 2		22		3
March 3	Y	24	Y	4
March 4		25		4

Note: ERG also received five surveys from calls to the toll-free hotline. The hotline was advertised as part of the newspaper recruitment and thus should be considered part of the newspaper responses. These were returned as paper surveys, however, and were analyzed as paper surveys (along with the ones from the state grantee training) in Section 5.0 below. Nevertheless, we summarize in this section as coming from newspaper recruitment.

4.3 PAPER SURVEY: STATE GRANTEE TRAINING SESSIONS

ERG staff contacted three state grantee training program contacts provided by MSHA in order to begin scheduling site visits and survey distribution with trainers in several states. While a few of these contacts had heard of the project, the individual instructors that would be distributing the survey needed to be briefed on the project's purpose and given time to review the survey. This section describes this implementation and summarizes the results of the survey.

Implementation

To facilitate distribution of the survey at miner training sessions, MSHA referred ERG to contacts at three state-level grantee miner training organizations. These were: (1) Beville State Community College Mine Training Center, Sumiton AL; (2) Penn State University Miner Training Program, University Park PA; and (3) Virginia Division of Mines, Minerals, and Energy, Big Stone Gap VA. In addition to these three referrals, ERG directly contacted two miner training organizations that were providing sessions within the time frame of the pilot testing: the Mining Technology and Training Center in Waynesburg PA and the Vincennes University Mining Program, Fort Branch, IN. ERG called each training site to explain the purpose of the project, describe the survey, gauge interest in participation, and identify training sessions when the surveys could be distributed. In what follows, we describe the outcomes from contacting these five sites.

In one case (the first scheduled distribution of the survey), an ERG staff person went to the training site to distribute the surveys personally; in the other cases, however, ERG sent the training program contact a batch of survey packets to distribute. The packets contained a copy of the survey, a list of FAQs, and a self-addressed stamped envelope. In some cases, either the grantee or the mine operators whose employees would be receiving the survey declined to participate. The following is a summary of the implementation details for each training program contact.

Site 1: Beville State Community College Mine Training Center, Sumiton, AL

Miner training takes place at the college. Contacts at the site were friendly and cooperative. The Director of the program, after reading the survey, said that ERG should obtain permission from the mine operator to distribute the survey and referred ERG to a management representative at the mine. ERG

discussed survey content and distribution with this representative (who knew about the survey previously from the Federal Register notice), obtained his approval, and arranged the logistics of distribution with him and the training program Director. The training classes were scheduled to be held for 80 to 100 miners on January 26, 2013.

Distribution: January 26, 2013. The morning before the training, the ERG representative met with a mine safety representative and the program coordinator to verify the logistics of distributing the survey. It had been previously agreed that the ERG representative would hand out the survey packages after the 8-hour training, as the miners walked between buildings on their way to a brief emergency response refresher. The ERG representative stood outside the entrance of the second building and handed out 52 surveys to the miners, all employees of the union mine. Some miners put their survey packages in their vehicles before entering the building. The ERG representative remained in his car in the parking lot and observed the miners coming out of the building, most with the packages still in hand.

Site 2: Penn State University Miner Training Program, University Park, PA

This contact provides training at mine sites throughout the mining regions of Pennsylvania. Our contact was extremely friendly and willing to assist. Upon reviewing the survey, he felt that he should ask each mine operator's permission to hand out the package, as the training would be on their property. All the operators with training sessions scheduled in February and March declined permission to distribute the survey.

Site 3: Virginia Division of Mines, Minerals, and Energy (DMME), Big Stone Gap, VA

DMME instructors provide training throughout the state's mining region to many small and medium size mines. Training sites are often locations such as restaurants, community centers, or other available meeting places near the mines. Contacts at DMME were extremely friendly and provided ERG significant assistance in distributing the survey. Several distributions were scheduled:

- *Distribution 1:* February 9, 2013. The DMME instructor handed out surveys to 12 miners during training. The instructor later reported that the miners seemed eager to have this opportunity to express some of their concerns. Theirs was a small, non-union coal mine, described by the instructor as a "family operation."
- *Distributions 2 and 3:* March 1, 2013. These distributions, to approximately 50 miners in two classes, were cancelled because the mine ceased operation prior to the training.
- *Distribution 4:* March 16, 2013. Operator would not permit distribution of the survey package at this class.
- *Distribution 5:* April 6, 2013. Operator would not permit distribution of the survey.

Site 4: Mining Technology and Training Center (MTTC), Waynesburg, PA.

MTTC provides a comprehensive suite of miner training at its campus in Waynesburg. Our contact was extremely friendly and cooperative. He volunteered to distribute the survey at several training sessions, with the following results:

- *Distribution 1:* February 18, 2013. Eleven surveys were distributed at a training course for mine rescue personnel.

- *Distribution 2:* March 17-March 31, 2013. These distributions, to miners undergoing fee-for-service mine rescue training, were cancelled due to a fire at one of the operator’s mines. One session was cancelled, and our contact did not pursue distribution at the other session because “management who could OK us to pass out the survey was involved with this event [the fire] and that is their only focus.”
- *Distribution 3:* April 19, 2013. This distribution was cancelled due to ongoing recovery from the fire at the mine.

Site 5: Vincennes University Mining Program, Fort Branch, IN.

This grantee provides a comprehensive suite of miner training, including 40-hour new miner training and 8-hour refresher training, both at their campus and sometimes at mine sites. ERG contacted the program office and sent the survey package contents via email. After approximately one week, ERG called the office manager back, and was told that the directors of the program declined to participate in survey distribution.

Survey Implementation Results

A total of 75 paper surveys were distributed through state grantee training programs. A total of 17 surveys were received in their return envelopes at ERG: three surveys from Alabama, three from Virginia, and 11 from MTTC in Pennsylvania. This is a response rate of 22.7 percent (all responses were in scope). It should be noted, however, that the 11 from MTTC were received from one specific session and that session was for mine rescue personnel.

ERG distributed the survey at one session itself (in Alabama) and sent surveys for distribution at other session by the training personnel. In Alabama, only 2 (out of approximately 50) refused to take the survey. The training personnel did not report problems with distributing the surveys.

Surveys were successfully distributed at three separate sites; five classes at which the survey was scheduled to be distributed were cancelled, distribution was declined by the operator or, on one occasion, the grantee contact felt it imprudent to request permission. In addition, one program declined to distribute the survey, and another was refused by all operators that had trainings scheduled for February and March. Certainly, a significant concern with distributing through the grantee program is that permission was declined in a number of cases.

4.4 SUMMARY

Table 4 presents the total number of survey responses collected through this pilot implementation of the data collection modes. As noted above, one potential concern we can identify from this summary is that 11 of the 17 state grantee responses came from one session and that session was targeted at mine rescue personnel. Without that site, participation in the survey was very low.

Table 4 – Number of Survey Responses Collected by Data Collection Mode

Data Collection Mode and Instance	Total Number of Responses	Total Number of In-Scope Responses
Combined	51	38

Newspaper	34	21
West Virginia	25	17
Pennsylvania	4	1
Hotline	5	3
State Grantee Training	17	17
Site 1 (BSCC MTC, AL)	3	3
Site 2 (PSU MTP, PA)	0	0
Site 3 (DMME, VA)	3	3
Site 4 (MTTC, PA)	11	11
Site 5 (VUMP, IN)	0	0

5.0 SUMMARY OF COLLECTED DATA

In this section we present a summary of the data collected with a focus on characterizing the respondents, highlighting responses to key survey questions, and comparing the results between instrument formats. A full tabulation of the responses to each survey question appears in Appendix E.²⁸

This section uses slightly different “bins” to describe the data compared to Section 4.0. In Section 4.0, we divided the data between “newspaper recruitment” and “state grant trainee” which focuses on the mode of data collection. In this section, we are more concerned with differences in the instrument format and thus we divide the responses between “paper” and “electronic” responses. The difference is that five paper survey responses were received from newspaper recruitment through survey hotline requests.

5.1 DEMOGRAPHICS

By design, all the respondents work in coal mining (or have worked in coal mining in the last 2 years), and are a miner or front line supervisor/foreman. Some characteristics of the respondents include:

- 55% work in a union mine, 58% belong to a union.
- 87% work in underground coal mining.
- 13% work for a contractor.
- The median mine production is 1 million or more tons of coal per year.
- The median number of workers at their mine is 250 or more, at the company is 3,000 or more.
- Worked for at least 5 years (median) with their current employer, 3 years (median) with their current supervisor, and 4 years (median) at their current location.

Additionally, eight respondents provided their mine name and could have followed the skip pattern to the end of the survey rather than answering the full set of demographic questions. However, six of these respondents disregarded the skip pattern and completed several of the demographic questions.

5.2 RESULTS BY VOICE CONCEPT AND INSTRUMENT FORMAT

This section presents tables that summarize the responses to key questions under each of the WRAAK concepts illustrated in the conceptual model, Figure 2; the concepts include:

- Awareness, access, and use of information about rights,
- Understanding of legal rights,
- Willingness to act on safety violation,
- Acting and the outcome of acting on a safety violation,
- Work environment (a measure of context), and

²⁸ Appendix E includes tabulations of the results by instrument format, by union membership status, and for non-supervisory miners by union membership status.

- Rating of the freedom to exercise their rights without fear of retaliation.

The tables will present the responses to each of the questions overall, and by instrument format (electronic or paper).

Awareness, Access and Use of Information

Table 5 describes the extent to which respondents know where to get information about their rights and feel that they have enough information to recognize a violation when it happens. Overall, 15 respondents (40 percent) strongly agreed with both statements. The results for the electronic format compared to the paper survey is very similar with the electronic respondents having slightly more strong agreement with the statements but the paper respondents having higher levels of overall agreement.

Table 5 – Summary of Responses to Questions about Miner Access to Information by Instrument Format

Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Blank
Combined (n = 38)						
I know where to get information about my mine safety rights.	15 (39.5%)	13 (34.2%)	6 (15.8%)	3 (7.9%)	1 (2.6%)	0 (0%)
I know enough about the Mine Act to recognize a violation when it happens.	15 (39.5%)	13 (34.2%)	8 (21.1%)	1 (2.6%)	1 (2.6%)	0 (0%)
Electronic (n=18)						
I know where to get information about my mine safety rights.	7 (38.9%)	5 (27.8%)	4 (22.2%)	2 (11.1%)	0 (0%)	0 (0%)
I know enough about the Mine Act to recognize a violation when it happens.	8 (44.4%)	5 (27.8%)	4 (22.2%)	1 (5.6%)	0 (0%)	0 (0%)
Paper (n=20)						
I know where to get information about my mine safety rights.	8 (40%)	8 (40%)	2 (10%)	1 (5%)	1 (5%)	0 (0%)
I know enough about the Mine Act to recognize a violation when it happens.	7 (35%)	8 (40%)	4 (20%)	0 (0%)	1 (5%)	0 (0%)

Next, respondents were asked about their awareness and use of a set of six MSHA outreach materials. The design of the skip pattern asked respondents if they had seen the material, and if so, if they had read it, and if so, if they would recommend the material. Table 6 summarizes responses to these questions by instrument format. In developing the table, we screened out responses that did not adhere to the skip pattern (e.g., a respondent who indicated they had not seen it, had not read it, but would recommend it). Awareness of the “One Call Does it All” hotline and MSHA.gov website are fairly high with over 60 percent of respondents indicating that they had heard of the resources. However, about 70 percent of those who had heard of the website have actually visited it, while only 20 percent of those who have heard of the hotline have used it. Respondents to the electronic method appear to be somewhat less likely to have seen a material when compared to the paper respondents.

Table 6 – Awareness and Use of Outreach Materials by Instrument Format

Question	Number answering Yes		
	Combined	Electronic	Paper
<i>A Guide to Miners' Rights and Responsibilities under the Federal Mine Safety and Health Act of 1977 (brochure)</i>			
Have you seen it?	16 (42.1%)	7 (38.9%)	9 (45%)
Have you read it?	14 (87.5%)	7 (100%)	7 (77.8%)
Would you recommend it?	14 (100%)	7 (100%)	7 (100%)
<i>Miners' Rights (trifold pamphlet)</i>			
Have you seen it?	18 (47.4%)	6 (33.3%)	12 (60%)
Have you read it?	14 (77.8%)	6 (100%)	8 (66.7%)
Would you recommend it?	13 (92.9%)	6 (100%)	7 (87.5%)
<i>Miners' Rights (small card)</i>			
Have you seen it?	17 (44.7%)	6 (33.3%)	11 (55%)
Have you read it?	15 (75%)	6 (100%)	9 (81.8%)
Would you recommend it?	14 (93.3%)	6 (100%)	8 (88.9%)
<i>"One Call Does it All" (telephone hotline)</i>			
Have you heard of it?	30 (78.9%)	15 (83.3%)	15 (75%)
Have you called it?	6 (20%)	2 (13.3%)	4 (26.7%)
Would you recommend it?	5 (83.3%)	2 (100%)	3 (75%)
<i>MSHA.gov (website)</i>			
Have you heard of it?	33 (86.8%)	16 (88.9%)	17 (85.0%)
Have you visited it?	24 (72.7%)	13 (81.3%)	11 (64.7%)
Would you recommend it?	24 (100%)	13 (100%)	11 (100%)
<i>Miners Rights (poster)</i>			
Have you seen it?	17 (44.7%)	7 (38.9%)	10 (50%)
Have you read it?	12 (70.6%)	5 (71.4%)	7 (70%)
Would you recommend it?	12 (100%)	5 (100%)	7 (100%)

Note: The total number of respondents to the access question (the second question asked for each material; e.g., "Have you read it?") is the number that said yes to the prior question (e.g., "Have you seen it?"). For the first question under each material (Have you seen it?) n = 38; subsequent question responses have been screened for inconsistent responses (e.g., respondent ignored skip pattern).

Understanding

The respondents were then asked about the extent to which they understood their legal rights under the mine act. These are summarized in Table 7. Respondents were asked if, prior to taking the survey, they were fully aware of a set of rights. Overall, respondent's indication that they understood their legal rights was 80 percent or more, with the exception of: choosing a representative (68.4 percent); getting a paid X-ray for Black Lung (73.7 percent); and, requesting a transfer to a less dusty job if diagnosed with Black Lung (68.4 percent). This difference is more dramatic for electronic respondents.

Table 7 – Respondent Understanding of Legal Rights by Instrument Format

Before taking this survey, I was fully aware I have the	Number answering Yes
---	----------------------

legal right to:	Combined	Electronic	Paper
Make a complaint about a possible danger or safety violation to mine management.	38 (100%)	18 (100%)	20 (100%)
Tell MSHA or a state agency about a possible safety hazard.	37 (97.4%)	17 (94.4%)	20 (100%)
Choose a representative to participate in all aspects of a mine inspection.	26 (68.4%)	10 (55.6%)	16 (80%)
Get an X-ray for signs of Black Lung, paid for by my employer.	28 (73.7%)	13 (72.2%)	15 (75%)
Ask to transfer to a less dusty job if I am diagnosed with Black Lung.	26 (68.4%)	10 (55.6%)	16 (80%)
Refuse to operate equipment I am not trained to use, and tell my supervisor.	36 (94.7%)	17 (94.4%)	19 (95%)
Refuse to work in conditions I believe to be unsafe.	37 (97.4%)	18 (100%)	19 (95%)
Complain to MSHA if I have been retaliated against for exercising my rights under the Mine Act.	31 (81.6%)	13 (72.2%)	18 (90%)

Willingness to Act

Respondents were also asked if they would feel comfortable acting on each right at their mine. These questions are summarized in Table 8. Overall, over 35 percent of respondents strongly agreed that they would be comfortable acting on each of those rights; however, comparing the two instrument formats shows that much of that strong agreement comes from the paper respondents. Nine to sixteen out of 20 paper respondents strongly agree that they would feel comfortable acting on their rights, while six or fewer out of 18 electronic respondents strongly agree.

Table 8 – Respondent Willingness to Act on their Legal Rights by Instrument Formats

At my mine, I would feel comfortable:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Blank
Combined (n = 38)						
Making a complaint about a possible danger or safety violation, to my mine management.	14 (36.8%)	17 (44.7%)	4 (10.5%)	2 (5.3%)	1 (2.6%)	0 (0%)
Telling MSHA or a state agency about a possible hazard.	13 (34.2%)	12 (31.6%)	5 (13.2%)	7 (18.4%)	0 (0%)	1 (2.6%)
Choosing a representative to participate in all aspects of a mine inspection.	14 (36.8%)	7 (18.4%)	10 (26.3%)	7 (18.4%)	0 (0%)	0 (0%)
Getting an X-ray for signs of Black Lung, paid for by my employer.	22 (57.9%)	5 (13.2%)	9 (23.7%)	2 (5.3%)	0 (0%)	0 (0%)
Asking for a transfer to a less dusty job if I am diagnosed with Black Lung.	17 (44.7%)	7 (18.4%)	11 (28.9%)	2 (5.3%)	0 (0%)	1 (2.6%)
Refusing to operate equipment I am not trained to use, and telling my supervisor.	19 (50.0%)	15 (39.5%)	3 (7.9%)	0 (0%)	1 (2.6%)	0 (0%)
Refusing to work in conditions I believe to be unsafe or unhealthy.	20 (52.6%)	11 (28.9%)	4 (10.5%)	2 (5.3%)	1 (2.6%)	0 (0%)
Complaining to MSHA if I have been retaliated against for exercising my rights under the Mine Act.	20 (52.6%)	6 (15.8%)	9 (23.7%)	2 (5.3%)	1 (2.6%)	0 (0%)
Electronic (n=18)						
Making a complaint about a possible danger or safety violation, to my mine management.	6 (33.3%)	7 (38.9%)	3 (16.7%)	2 (11.1%)	0 (0%)	0 (0%)
Telling MSHA or a state agency about a possible hazard.	4 (22.2%)	7 (38.9%)	1 (5.6%)	5 (27.8%)	0 (0%)	1 (5.6%)
Choosing a representative to participate in all aspects of a mine inspection.	3 (16.7%)	5 (27.8%)	5 (27.8%)	5 (27.8%)	0 (0%)	0 (0%)
Getting an X-ray for signs of Black Lung, paid for by my	6	4	6	2	0	0

At my mine, I would feel comfortable:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Blank
employer.	(33.3%)	(22.2%)	(33.3%)	(11.1%)	(0%)	(0%)
Asking for a transfer to a less dusty job if I am diagnosed with Black Lung.	3 (16.7%)	5 (27.8%)	8 (44.4%)	1 (5.6%)	0 (0%)	1 (5.6%)
Refusing to operate equipment I am not trained to use, and telling my supervisor.	5 (27.8%)	10 (55.6%)	3 (16.7%)	0 (0%)	0 (0%)	0 (0%)
Refusing to work in conditions I believe to be unsafe or unhealthy.	5 (27.8%)	8 (44.4%)	3 (16.7%)	2 (11.1%)	0 (0%)	0 (0%)
Complaining to MSHA if I have been retaliated against for exercising my rights under the Mine Act.	6 (33.3%)	5 (27.8%)	5 (27.8%)	1 (5.6%)	1 (5.6%)	0 (0%)
Paper (n=20)						
Making a complaint about a possible danger or safety violation, to my mine management.	8 (40%)	10 (50%)	1 (5%)	0 (0%)	1 (5%)	0 (0%)
Telling MSHA or a state agency about a possible hazard.	9 (45%)	5 (25%)	4 (20%)	2 (10%)	0 (0%)	0 (0%)
Choosing a representative to participate in all aspects of a mine inspection.	11 (55%)	2 (10%)	5 (25%)	2 (10%)	0 (0%)	0 (0%)
Getting an X-ray for signs of Black Lung, paid for by my employer.	16 (80%)	1 (5%)	3 (15%)	0 (0%)	0 (0%)	0 (0%)
Asking for a transfer to a less dusty job if I am diagnosed with Black Lung.	14 (70%)	2 (10%)	3 (15%)	1 (5%)	0 (0%)	0 (0%)
Refusing to operate equipment I am not trained to use, and telling my supervisor.	14 (70%)	5 (25%)	0 (0%)	0 (0%)	1 (5%)	0 (0%)
Refusing to work in conditions I believe to be unsafe or unhealthy.	15 (75%)	3 (15%)	1 (5%)	0 (0%)	1 (5%)	0 (0%)
Complaining to MSHA if I have been retaliated against for exercising my rights under the Mine Act.	14 (70%)	1 (5%)	4 (20%)	1 (5%)	0 (0%)	0 (0%)

Another topic of interest related to willingness to act is how the respondent would react if they found a safety hazard in their mine. Table 9 summarizes the extent to which the respondents agree that they would take a specific action if they saw a safety hazard. The action that received the strongest agreement was “tell my supervisor” which 23 of 38 respondents strongly agreed they would do; interestingly, the item that received the strongest disagreement was “not say anything” (22 of 38 respondents strongly disagree). In comparing the two collection modes, it appears that the paper respondents are more likely to strongly agree with the other statements about how to respond to a safety hazard, while the electronic respondents were more likely to leave the question blank. An example of this contrast is the response to the phrase “If I saw a safety hazard, I would fix it myself”; eight of 18 electronic respondents left this item blank while 19 of the 20 paper respondents indicated some level of agreement.

Table 9 – Respondent Willingness to Act on Safety Hazards in the Mine by Instrument Formats

If I saw a safety hazard, I would:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Blank
Combined (n = 38)						
Fix it myself.	14 (36.8%)	12 (31.6%)	2 (5.3%)	1 (2.6%)	1 (2.6%)	8 (21.1%)
Tell someone outside the mine.	7 (18.4%)	14 (36.8%)	7 (18.4%)	5 (13.2%)	4 (10.5%)	1 (2.6%)
Tell a coworker.	12 (31.6%)	21 (55.3%)	4 (10.5%)	1 (2.6%)	0 (0%)	0 (0%)
Tell a union representative.	8 (21.1%)	8 (21.1%)	10 (26.3%)	6 (15.8%)	4 (10.5%)	2 (5.3%)
Tell a miner's representative.	10 (26.3%)	11 (28.9%)	9 (23.7%)	6 (15.8%)	1 (2.6%)	1 (2.6%)
Tell my supervisor.	23 (60.5%)	13 (34.2%)	2 (5.3%)	0 (0%)	0 (0%)	0 (0%)
Tell my mine management.	17 (44.7%)	14 (36.8%)	4 (10.5%)	2 (5.3%)	0 (0%)	1 (2.6%)
Tell the mine inspector next time they come to the mine.	11 (28.9%)	7 (18.4%)	11 (28.9%)	4 (10.5%)	5 (13.2%)	0 (0%)
Call MSHA's Hotline.	5 (13.2%)	6 (15.8%)	15 (39.5%)	7 (18.4%)	4 (10.5%)	1 (2.6%)
Call MSHA's field or district office.	6 (15.8%)	4 (10.5%)	16 (42.1%)	5 (13.2%)	6 (15.8%)	1 (2.6%)
Tell a state agency.	7 (18.4%)	5 (13.2%)	14 (36.8%)	6 (15.8%)	6 (15.8%)	0 (0%)
Not say anything.	2 (5.3%)	1 (2.6%)	2 (5.3%)	9 (23.7%)	22 (57.9%)	2 (5.3%)
Electronic (n=18)						
Fix it myself.	2 (11.1%)	5 (27.8%)	1 (5.6%)	1 (5.6%)	1 (5.6%)	8 (44.4%)
Tell someone outside the mine.	2 (11.1%)	6 (33.3%)	2 (11.1%)	5 (27.8%)	2 (11.1%)	1 (5.6%)
Tell a coworker.	5 (27.8%)	11 (61.1%)	1 (5.6%)	1 (5.6%)	0 (0%)	0 (0%)
Tell a union representative.	3 (16.7%)	4 (22.2%)	3 (16.7%)	4 (22.2%)	2 (11.1%)	2 (11.1%)
Tell a miner's representative.	4 (22.2%)	4 (22.2%)	5 (27.8%)	3 (16.7%)	1 (5.6%)	1 (5.6%)
Tell my supervisor.	8 (44.4%)	9 (50%)	1 (5.6%)	0 (0%)	0 (0%)	0 (0%)
Tell my mine management.	6 (33.3%)	7 (38.9%)	2 (11.1%)	2 (11.1%)	0 (0%)	1 (5.6%)
Tell the mine inspector next time they come to the mine.	4 (22.2%)	5 (27.8%)	6 (33.3%)	1 (5.6%)	2 (11.1%)	0 (0%)
Call MSHA's Hotline.	1 (5.6%)	4 (22.2%)	8 (44.4%)	3 (16.7%)	1 (5.6%)	1 (5.6%)
Call MSHA's field or district office.	1 (5.6%)	3 (16.7%)	9 (50%)	3 (16.7%)	1 (5.6%)	1 (5.6%)
Tell a state agency.	3 (16.7%)	3 (16.7%)	8 (44.4%)	3 (16.7%)	1 (5.6%)	0 (0%)
Not say anything.	0 (0%)	1 (5.6%)	0 (0%)	6 (33.3%)	9 (50%)	2 (11.1%)
Paper (n=20)						
Fix it myself.	12 (60%)	7 (35%)	1 (5%)	0 (0%)	0 (0%)	0 (0%)
Tell someone outside the mine.	5 (25%)	8 (40%)	5 (25%)	0 (0%)	2 (10%)	0 (0%)
Tell a coworker.	7 (35%)	10 (50%)	3 (15%)	0 (0%)	0 (0%)	0 (0%)
Tell a union representative.	5 (25%)	4 (20%)	7 (35%)	2 (10%)	2 (10%)	0 (0%)
Tell a miner's representative.	6 (30%)	7 (35%)	4 (20%)	3 (15%)	0 (0%)	0 (0%)
Tell my supervisor.	15 (75%)	4 (20%)	1 (5%)	0 (0%)	0 (0%)	0 (0%)
Tell my mine management.	11 (55%)	7 (35%)	2 (10%)	0 (0%)	0 (0%)	0 (0%)
Tell the mine inspector next time they come to the mine.	7 (35%)	2 (10%)	5 (25%)	3 (15%)	3 (15%)	0 (0%)
Call MSHA's Hotline.	4 (20%)	2 (10%)	7 (35%)	4 (20%)	3 (15%)	0 (0%)
Call MSHA's field or district office.	5 (25%)	1 (5%)	7 (35%)	2 (10%)	5 (25%)	0 (0%)
Tell a state agency.	4 (20%)	2 (10%)	6 (30%)	3 (15%)	5 (25%)	0 (0%)
Not say anything.	2 (10%)	0 (0%)	2 (10%)	3 (15%)	13 (65%)	0 (0%)

Acting and Outcome

Next, respondents were asked how they responded the last time they saw a safety hazard, and how mine management and their coworkers responded to that action. Table 10 summarizes the number

of respondents who informed someone the last time they saw a hazard and if they experienced a negative reaction, by instrument format. Over 80 percent of the respondents (32) informed someone at their mine or a Federal or state agency the last time they saw a safety hazard; two of those respondents experienced a negative reaction from coworkers and five experienced a negative reaction from management.

Table 10 - Responses on Reporting of a Safety Hazard by Instrument Format

Question	Number answering Yes		
	Combined	Electronic	Paper
The last time I saw a safety hazard, I told someone at my mine or a Federal or state agency.	32 (84.2%)	14 (77.8%)	18 (90%)
After I reported the hazard, I felt some negative reaction from my coworkers.	2 (6.3%)	1 (7.1%)	1 (5.6%)
After I reported the hazard, I felt some negative reaction from management.	5 (15.6%)	2 (14.3%)	3 (16.7)

Context

Context includes factors such as the work environment, regulatory structure, community, and individual personality that influence an individual's sense of freedom to act on their rights. Table 11 summarizes the extent to which respondents agreed with a set of statements about their work environment; overall, about one third of respondents strongly agreed with statements that indicated they worked in a mine that took safety seriously. Only five respondents indicated agreement with the statement "If I could, I would leave my job to work at a different mine," all of those respondents participated through the electronic format.

Table 11 – Summary of Responses to Questions about the Mine Work Environment by Instrument Format

Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Blank
Combined (n = 38)						
I trust my mine management to provide a safe and healthful workplace.	12 (31.6%)	17 (44.7%)	5 (13.2%)	3 (7.9%)	1 (2.6%)	0 (0%)
My mine is a safe mine.	13 (34.2%)	21 (55.3%)	1 (2.6%)	1 (2.6%)	1 (2.6%)	1 (2.6%)
If I point out a safety hazard, my mine management fixes the problem.	11 (28.9%)	22 (57.9%)	4 (10.5%)	0 (0%)	1 (2.6%)	0 (0%)
I can point out a safety hazard without worrying about the consequences.	13 (34.2%)	18 (47.4%)	5 (13.2%)	1 (2.6%)	1 (2.6%)	0 (0%)
If I could, I would leave my job to work at a different mine.	1 (2.6%)	4 (10.5%)	7 (18.4%)	16 (42.1%)	10 (26.3%)	0 (0%)
Electronic (n=18)						
I trust my mine management to provide a safe and healthful workplace.	3 (16.7%)	10 (55.6%)	2 (11.1%)	3 (16.75)	0 (0%)	0 (0%)
My mine is a safe mine.	4 (22.2%)	12 (66.7%)	0 (0%)	1 (5.6%)	0 (0%)	1 (5.6%)
If I point out a safety hazard, my mine management fixes the problem.	3 (16.7%)	12 (66.7%)	3 (16.7%)	0 (0%)	0 (0%)	0 (0%)

Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Blank
I can point out a safety hazard without worrying about the consequences.	5 (27.8%)	9 (50.0%)	3 (16.7%)	1 (5.6%)	0 (0%)	0 (0%)
If I could, I would leave my job to work at a different mine.	1 (5.6%)	4 (22.2%)	1 (5.6%)	9 (50%)	3 (16.7%)	0 (0%)
Paper (n=20)						
I trust my mine management to provide a safe and healthful workplace.	9 (45.0%)	7 (35.0%)	3 (15.0%)	0 (0%)	1 (5.0%)	0 (0%)
My mine is a safe mine.	9 (45.0%)	9 (45.0%)	1 (5.0%)	0 (0%)	1 (5.0%)	0 (0%)
If I point out a safety hazard, my mine management fixes the problem.	8 (40.0%)	10 (50.0%)	1 (5.0%)	0 (0%)	1 (5.0%)	0 (0%)
I can point out a safety hazard without worrying about the consequences.	8 (40.0%)	9 (45.0%)	2 (10.0%)	0 (0%)	1 (5.0%)	0 (0%)
If I could, I would leave my job to work at a different mine.	0 (0%)	0 (0%)	6 (30.0%)	7 (35.0%)	7 (35.0%)	0 (0%)

Respondents were also asked about regulatory structure, such as the extent to which they trust MSHA to defend their rights and maintain their confidentiality. The results are summarized by instrument format in Table 12. Overall, around 40 percent trust MSHA to stand up for their rights (16 respondents) and maintain confidentiality (14 respondents).

Table 12 – Respondent Trust in MSHA by Instrument Format

I trust MSHA to:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Blank
Combined (n=38)						
Stand up for my rights as a miner.	16 (42.1%)	9 (23.7%)	6 (15.8%)	1 (2.6%)	3 (7.9%)	3 (7.9%)
Keep what I tell them confidential (not tell my employer).	14 (36.8%)	10 (26.3%)	2 (5.3%)	6 (15.8%)	4 (10.5%)	2 (5.3%)
Electronic (n=18)						
Stand up for my rights as a miner.	3 (16.7%)	6 (33.3%)	4 (22.2%)	0 (0%)	2 (11.1%)	3 (16.7%)
Keep what I tell them confidential (not tell my employer).	4 (22.2%)	6 (33.3%)	2 (11.1%)	4 (22.2%)	1 (5.6%)	1 (5.6%)
Paper (n=20)						
Stand up for my rights as a miner.	13 (65%)	3 (15%)	2 (10%)	1 (5%)	1 (5%)	0 (0%)
Keep what I tell them confidential (not tell my employer).	10 (50%)	4 (20%)	0 (0%)	2 (10%)	3 (15%)	1 (5%)

Finally, respondents were asked to rate the extent to which they feel free to exercise their rights in their workplace without fear of retaliation on a scale from 1 (not free at all) to 5 (extremely free), see Table 13. Overall, about 40 percent of respondents indicated they feel “extremely free” to exercise their rights.

Table 13 – Respondents’ Perceived Freedom to Exercise Their Rights by Instrument Format

How free do you feel to exercise your rights in your mine without fear of retaliation?	5 Extremely Free	4	3	2	1 Not free at all
Combined (n=38)	15 (39.5%)	8 (21.1%)	8 (21.1%)	2 (5.3%)	5 (13.2%)
Electronic (n=18)	4 (22.2%)	5 (27.8%)	4 (22.2%)	1 (5.6%)	4 (22.2%)
Paper (n=20)	11 (55%)	3 (15%)	4 (20%)	1 (5%)	1 (5%)

5.3 ASSESSMENT OF CONCEPTUAL MODEL OF WRAAK

This section provides an assessment of the conceptual model we presented in Section 3.2 above. As can be seen in Figure 2, the model implies a number of linkages between the concepts we used to define WRAAK. In this section we explore six of those linkages (formulated as questions) using data we collected to assess whether the model and the collected data are consistent.²⁹

- Is there a link between miners’ **use** of MSHA’s materials and their **understanding**?
- Is there a link between miners’ **understanding** and their **willingness to act**?
- Is there a link between miners’ **willingness to act** and their having taken an **action** in the past?
- Is there a link between miner’s **understanding** and their having taken an **action** in the past?
- Is there a link between miners’ **understanding** and their perception that they have freedom (**sense of empowerment**) to exercise their rights?
- Is there a link between miners’ **use** of MSHA’s materials and their perception that they have freedom (**sense of empowerment**) to exercise their rights?

The first three linkages and the fifth linkage are explicitly drawn from the model in Figure 2. The fourth linkage flows from the model, but allows understanding to “bypass” willingness to act to and to influence action directly. The last one looks for which MSHA materials are more closely aligned with empowerment. We did not address the links between taking an **action** and **outcomes** and whether **outcomes** (positive or negative) influence sense of **empowerment** (see arrow flows in the model). These linkages are more complex and would require additional data points.

A general limitation we have in this analysis is the small number of data points available for analysis. For the most part, we are relying on 38 survey responses. Thus, our goal in this section cannot be to validate the model. Rather, we are looking for whether the data we collected are at least consistent with the model in Figure 2. Full model validation would require additional data points.

²⁹ The words in bold link back to the concepts defined in Section 3.2 above.

Link between Use and Understanding

To assess whether there was a link between use and understanding, we began by developing a measure of the number of MSHA materials that each respondent claimed to have used. This was formulated using the “use” questions from the survey. These are summarized in Table 6 above as “Have you read/visited/called it?”. To formulate a measure of use, we simply added up the number of materials that each respondent used. Next, we calculated a “score” for each respondent based on their understanding of their rights (Table 7). A respondent was given one “point” for each right they claimed to have understood prior to the survey. These two measures are cross-tabulated in Table 14. Based on this cross-tabulation, it appears that miners that used more materials tended have better understanding.

Table 14 – Cross-Tabulation between Measure of Use and Measure of Understanding

Understanding: Number of Rights the Respondent Claimed to be Aware of	Use: Number of Materials Used		Total
	0 - 2	3 - 6	
2	0	1	1
4	2	0	2
5	4	0	4
6	3	2	5
7	5	3	8
8	7	10	17
Total	21	16	37

Link between Understanding and Willingness to Act

Table 15 cross-tabulates understanding (from Table 7) with miners’ willingness to take action (Table 8). Miners that indicated they were aware of a certain right were also very likely to say that would be willing to act on that right. However, the reverse cannot also be said: i.e., miners who were not aware of a right did not consistently indicate they would not act on the right. Nevertheless, the data appear to be consistent with the model in Figure 2.

Table 15 – Cross-Tabulation between Measures of Willingness to Act and Measure of Understanding

Understanding: Aware They Have the Right (Yes/No)	Willingness to Act: Degree to Which Miners Agree they are Comfortable in Exercising Their Rights	
	Strongly Agree or Agree	Neutral, Disagree, or Strongly Disagree
<i>Make a complaint about a possible danger or safety violation to mine management.</i>		
Yes	31	7

Understanding: Aware They Have the Right (Yes/No)	Willingness to Act: Degree to Which Miners Agree they are Comfortable in Exercising Their Rights	
	Strongly Agree or Agree	Neutral, Disagree, or Strongly Disagree
No	0	0
<i>Tell MSHA or a state agency about a possible safety hazard.</i>		
Yes	24	13
No	1	0
<i>Choose a representative to participate in all aspects of a mine inspection.</i>		
Yes	18	8
No	3	9
<i>Get an X-ray for signs of Black Lung, paid for by my employer.</i>		
Yes	22	6
No	5	5
<i>Ask to transfer to a less dusty job if I am diagnosed with Black Lung.</i>		
Yes	22	4
No	2	10
<i>Refuse to operate equipment I am not trained to use, and tell my supervisor.</i>		
Yes	34	2
No	0	2
<i>Refuse to work in conditions I believe to be unsafe.</i>		
Yes	30	7
No	1	0
<i>Complain to MSHA if I have been retaliated against for exercising my rights under the Mine Act.</i>		
Yes	24	7
No	2	5

Link between Willingness to Act and Taking Action

Table 16 cross-tabulates willingness to act against miners' taking an action. The survey asked miners if they had reported a hazard the last time they had seen one (see Table 9); we used this as a measure of miners' taking an action. We crossed this against two measures of willingness to act: (1) being comfortable in making a complaint to mine management and (2) telling MSHA or state agency about a possible safety hazard.³⁰ As can be seen, those that were comfortable in taking an action were also much more likely to have told someone about the last hazard they saw. The relationship appears stronger for being willing to complain to mine management compared to being willing to tell MSHA or a state agency about a hazard. Nevertheless, these results are limited since only six respondents indicated that they had not told someone about the last hazard they saw.

³⁰ The other rights were less relevant for the action of reporting a safety hazard.

Table 16 – Cross-Tabulation of Measures of Willingness to Act and Measure of Taking Action

Willingness to Act: Degree to Which Miners Agree they are Comfortable in Exercising Their Rights	Told Someone Last Time they Saw a Hazard	
	Yes	No
<i>Make a complaint about a possible danger or safety violation to mine management.</i>		
Strongly Agree or Agree	27	4
Neutral, Disagree, or Strongly Disagree	5	2
<i>Tell MSHA or a state agency about a possible safety hazard.</i>		
Strongly Agree or Agree	22	3
Neutral, Disagree, or Strongly Disagree	10	3

Link between Understanding and Taking Action

Table 17 cross-tabulates miners' telling someone the last time they saw a hazard with miners' understanding they have the right to complain to management and to tell MSHA or state agency about a hazard. Unfortunately, since most miners indicated they were aware of these two rights and reported the last hazard they saw, little can be discerned from these data. Table 18 tries to circumvent this issue by comparing the number of rights that miners were aware of (see Table 14 above) with taking action. Once again, the few data points on not telling about last hazard seen makes it difficult to draw conclusions.

Table 17 – Cross-Tabulation of Measures of Understanding of Rights and Measure of Taking Action

Understanding: Aware They Have the Right (Yes/No)	Told Someone Last Time they Saw a Hazard	
	Yes	No
<i>Make a complaint about a possible danger or safety violation to mine management.</i>		
Yes	32	6
No	0	0
<i>Tell MSHA or a state agency about a possible safety hazard.</i>		
Yes	32	5
No	0	1

Table 18 – Cross-Tabulation of Number of Rights that Miners Understand They Have with Telling Someone about the Last Hazard They Saw

Understanding: Number of Rights the Respondent Claimed to be Aware of	Told Someone Last Time they Saw a Hazard		Total
	Yes	No	
2	0	1	1
4	1	1	2
5	3	1	4
6	5	0	5
7	7	1	8
8	15	2	17
Total	31	6	37

Link between Understanding and Sense of Empowerment

Table 19 cross-tabulates miners’ responses on feeling free to exercise their rights with the numbers of rights that miners’ claimed to be aware of. Those who are aware of the most rights also tend to be more likely to feel free to exercise their rights. This appears to be consistent with the model in Figure 2.

Table 19 – Cross-Tabulation of Sense of Empowerment and Understanding

Understanding: Numbers of Rights the Respondent Claimed to be Aware of	Feels Free to Exercise Rights		Total
	Yes	No	
2-6	4	8	12
7-8	18	7	25
Total	22	15	37

Link between Use of MSHA Materials and Sense of Empowerment

Table 20 cross-tabulates miners' feeling that they are free to exercise their rights with the numbers of materials they have used. Miners who indicated that they felt free to exercise their rights had used more MSHA materials; the reverse is also true: miners who did not feel free to exercise their rights had used fewer materials. Table 21 explores the relationship further by breaking out use of which materials were more closely aligned with miners' feeling they had the freedom to exercise their rights. These data indicate that the Guide and the trifold pamphlet are most closely aligned with miners feeling they had the freedom to exercise their rights with the miners' rights small card and the poster also showing a strong relationship.

Table 20 – Cross-Tabulation between Sense of Empowerment and Number of MSHA Materials Used

Numbers of Materials Used	Feels Free to Exercise Rights		Totals
	Yes	No	
0-2	8	13	21
3-6	15	2	17
Totals	23	15	38

Note: the odds ratio between feeling free to exercise rights and the number of materials used is 2.07 with a 2.72 z-statistic (statistically significant at the one percent level). That is, as the number of materials used increased, miners are more likely to indicate that they feel free to exercise their rights.

Table 21 – Cross-Tabulation of Sense Empowerment and Use of Specific MSHA Materials

Used MSHA Materials (Yes/No)	Feels Free to Exercise Rights		Odds Ratio between Feeling Free to Exercise Rights and Use of MSHA Materials (z- statistic) [a]
	Yes	No	
<i>A Guide to Miners' Rights and Responsibilities under the Federal Mine Safety and Health Act of 1977 (brochure)</i>			
Yes	13	1	18.2
No	10	14	(2.6)**
<i>Miners' Rights (trifold pamphlet)</i>			
Yes	12	2	7.09
No	11	13	(2.26)**

Miners' Rights (small card)			
Yes	12	3	4.36 (1.92)*
No	11	12	
"One Call Does it All" (telephone hotline)			
Yes	5	1	3.89 (1.18)
No	18	14	
MSHA.gov (website)			
Yes	15	9	1.25 (0.33)
No	8	6	
Miners Rights (poster)			
Yes	10	2	5.00 (1.85)*
No	13	13	

[a] The odds ratio reflects the likelihood that miners who used the specific material also felt they were free to exercise their rights compared to those who had not used the material. For example, for the trifold pamphlet, a miner used pamphlet was seven times (7.09) more likely to have said they felt free to exercise their rights compared to miners who had not used the pamphlet.

** Statistically significant at the one percent level of significance.

* Statistically significant at the ten percent level of significance.

Summary

Although the number of respondents to the surveys was small (38 usable responses) and potentially biased, (each summary statement should be interpreted with caution), the analysis in this section indicates some level of support for the conceptual model. In regards to each of the links in the model we assessed we found the following:

- **Link between miners' use of MSHA's materials and their understanding.** There is some evidence that use of more materials is associated with higher understanding.
- **Link between miners' understanding and their willingness to act.** The data indicate that miners who were aware of a certain right were also very likely to say that would be willing to act on that right.
- **Link between miners' willingness to act and their having taken an action.** The survey indicates that miners who were comfortable in taking an action were also much more likely to have told someone about the last hazard they saw. However, there are few data points in the survey on those who did not tell someone about the last hazard they saw, limiting this result to some degree.
- **Link between miner's understanding and their having taken an action in the past.** Due to the lack of variation in the data, it is difficult to draw any conclusions on this link.
- **Link between miners' understanding and their perception that they have freedom (sense of empowerment) to exercise their rights.** The data indicate that miners who are aware of more rights also tend to be more likely to feel free to exercise their rights.
- **Link between miners' use of MSHA's materials and their perception that they have freedom (sense of empowerment) to exercise their rights.** Here we found that increased

use of MSHA materials is associated with miners feeling they have the freedom to exercise their rights. The Guide to Miners' Rights and the trifold pamphlet seem to be most closely aligned with a sense of empowerment.

6.0 OBSERVATIONS AND RECOMMENDATIONS

This section presents ERG's observations and recommendations based on the results of our pilot data collection implementation. The goal of this pilot project is to answer the study question:

What measures of worker's rights – access, assertion, and knowledge and perceived noncompliance, combined with what modes of data collection could be best used to track MSHA's worker protection outreach activity?

With that in mind, we will focus this section on describing the extent to which the WRAAK measures we developed and the data collection modes we implemented were effective at collecting information that could be used to measure mine workers' ability to act on their legal rights without fear of retaliation.

6.1 OBSERVATIONS

This section presents some observations related to implementing the data collection modes and reviewing the survey results. As we have noted above, the data we collected cannot be considered representative of coal miners.

Measures and Survey Instruments

- ***The survey instruments were effective at collecting responses, but this observation was based on few responses.*** In reviewing the way in which respondents answered the questionnaire, we found that respondents did not tend to skip questions, including questions that we anticipated to be difficult for respondents (e.g., mine name). There were a few questions that were left blank by respondents; in those cases fewer than four respondents skipped the question. Additionally, on the paper version of the survey, some respondents provided answers to questions that they were directed to skip.
- ***Most respondents are aware of the outreach materials.*** The overarching study question asks about what measures and modes could be used to track MSHA outreach activities. About 50 percent or more respondents indicated that they were aware of each material. Thus, tracking outreach does appear to be possible given the awareness of the materials.
- ***Responses appear to be internally consistent.*** In general, most respondents indicated strong agreement with statements about awareness of their rights, and comfort acting on those rights, which is consistent with the number of respondents providing a high rating of their freedom to act on their rights in their workplace without fear of retaliation.
- ***The data collected under the survey provide some support for the conceptual model of voice.*** Section 5.3 analyzed the survey data using the conceptual model as a basis for the analysis and found support for some of the linkages in the model. However, the lack of data collected under the survey limits the strength of this conclusion.
- ***WRAAK measures require more data and analysis to provide actionable information.*** While the responses to the survey provide useful evidence to support the framework,

additional data would be required to perform a calculation of the WRAAK measures and perform analyses needed to validate the approach. Additionally, in order to provide useful feedback that DOL could use to track and target worker protection outreach activity the survey would need to collect a sufficient number of responses with enough variability at the MSHA district office level. This would be the minimum amount of information needed to identify geographic areas with problematic results that could be targeted with additional outreach activities.

Data Collection Modes

Our findings related to the effectiveness of the data collection modes are influenced by the compressed timeframe (three months) in which we implemented them. With that caveat in mind, we made the following observation on the data collection approaches:

- ***The newspaper advertisement method is easy to monitor but inconsistent and expensive.*** There was considerable difference in the response rate between the newspaper ads that ERG scheduled, with the ad in the Charleston Gazette bringing in 25 responses and the two ads in Pennsylvania generating only four responses. As a result, the ad cost per respondent is very high and the responses to the online survey primarily reflect conditions in West Virginia. However, once the web-based survey instrument is set up and the advertisement scheduled this data collection approach is very easy to monitor and manage over the desired timeframe.
- ***The training event recruitment approach must balance survey distribution with training program needs.*** ERG found the state grantee training program contacts to be very friendly and interested in supporting the survey effort; however, these programs provide a service to the mine operators and must maintain professional relationships with them. As a result, the training program contacts preferred to obtain the permission of the mine operator before distributing the survey package during their training events; some mine operators declined. It is likely that the mine operators who are comfortable with the survey distribution are also creating a more supportive safety and health environment for their employees and this would be reflected in the survey results, possibly biasing the sample. Additionally, this approach requires a longer timeframe for scheduling survey distribution due to the need to coordinate with scheduled training events and secure the cooperation of the training program and mine operator.

6.2 RECOMMENDATIONS

Based on our conclusions, we have the following recommendations.

Measures and Survey Instruments

- ***ERG recommends continued use of the conceptual model that we developed as a framework for viewing WRAAK in mining workplaces.*** The analyses we performed in Section 5.3 support the model, albeit with limited data. The model provides a framework for

understanding how MSHA activities can influence workers' comfort in exercising their rights. However, we only had limited data to use in assessing the model. Additional data would be needed to assess the validity of the model. A valid conceptual model would assist MSHA in better understanding how it could improve WRAAK.

- **ERG recommends continued use of the survey instrument.** The survey instrument appears to have performed well based on our review of the submitted surveys. However, an additional round of pre-testing may improve the instrument further.

Data Collection Modes

- **ERG does not recommend continued use of the newspaper advertisement as a viable mode for implementing this type of survey.** In order to improve the consistency of responses and minimize logistics, the advertisement would need to feature a higher profile ad style and placement in order to attract attention and the advertisement should be scheduled on a longer, recurring timeframe to take advantage of bulk pricing and reduce staff time. Even with these revisions, a broader implementation would be very costly. Also, obtaining a random, representative sample with this method is problematic.
- **MSHA should consider modifying its grants program if the agency believes that the data on WRAAK are valuable to its outreach efforts.** The state grantee training program contacts are supportive of the effort; however, they would need to be empowered to incorporate the survey into training in order to avoid conflict with their customers, the mine operators, and to make this data collection approach viable. If MSHA deems collection of these data valuable, then it should consider making collection of these data a part of the grants for the training programs or a part of the training itself.³¹ For example, MSHA could have the survey (or a subset of the survey) be taken as part of the required training. MSHA could also require that grantees administer a certain number of the surveys based on a random selection of training sessions. ERG recognizes, however, that the training grants program has objectives and requirements well beyond the collection of these data. Thus, MSHA would need to balance the needs and requirements of grants program with the value of data on WRAAK.
- **DOL and MSHA should consider the trade-off between collection of any data and collection of representative data.** One goal of this project was to determine if there was a data collection mode that could be used to collect representative data from miners. Both of the feasible modes we tested had difficulties in obtaining this goal. However, there may be some methods that would result in collection of data that are not representative, but would provide data. For example,³² MSHA could ask callers to the complaint hotline to take the survey, MSHA could have the survey posted on its website, MSHA could have it advertised in

³¹ As part of this framework, the survey would need to collect more detailed information on the training and the participants (e.g., union/non-union, size of mine, type of mine, etc.) to develop appropriate sampling weights to extrapolate to the population of miners.

³² MSHA would need OMB approval for distributing surveys in this manner.

mining publications or newspapers,³³ MSHA could have the survey discussed in blogs, or it could even use social media (e.g., Facebook, Twitter) to get the survey into the hands of miners. All of these approaches would generate responses to the survey, but would not result in representative data. However, the data collected may be useful to MSHA in understanding issues it may need to address in its outreach. This approach may also generate some “false” responses from mine operator management. Those responses may not be distinguishable from true miner responses and might provide a biased picture of worker WRAAK. On the other hand, under this approach MSHA would be looking for problem areas and responses that indicated issues with WRAAK would be of more interest.³⁴

- **Consider offering an incentive.** In conjunction with the previous recommendation, DOL should consider whether offering an incentive for participation. Incentives have been shown to increase survey response rate.³⁵ The incentive provided should be small (e.g., worth \$5 or less); a large incentive may appear to the respondent that DOL is “purchasing” a response and the potential respondents may weigh the value of their time against the value of the incentive. Additionally, DOL should avoid offering an incentive that involves collecting identifying information on the respondent for the incentive to be provided (e.g., entering each respondent into a drawing for cash or a valuable item would require the respondent providing DOL with identifying information). As has been discussed, MSHA has expressed concerns about a survey mechanism that is not anonymous. An appropriate incentive may be a \$5 (or less) gift card that the respondent can use to purchase something small (e.g., part of lunch, a cup of coffee, etc.). Furthermore, the incentive should only be provided for *completed* surveys.
- **DOL and MSHA should take advantage of emerging delivery mechanisms in future data collections.** During the second TWG meeting, the TWG members discussed potential delivery mechanisms that have emerged since the beginning of this project; such as the expansion and maturation of social networking, and the emergence of online training for miners. Social networking could operate in two ways: a conduit for raising awareness of and recruiting respondents to the survey, and as a way to reach out to miner communities. For example, a coal mining focused blog could post a link for the survey and describe how to participate, or provide a space where members of the mining community feel comfortable airing concerns about the mines.

³³ Above we have not recommended use of the newspaper advertisement for collection of representative data. Here we are suggesting it could be used to collect non-representative data.

³⁴ Since the data would not be representative, there would be no need to calculate overall measures of WRAAK and the characterize WRAAK in the mining industry.

³⁵ Dillman, Don, 2000. *Mail and Internet Surveys: The Tailored Design Method*, Second Edition, John Wiley & Sons, Incorporated.