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DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention

[60Day-12-12SG]

Proposed Data Collections Submitted for
Public Comment and Recommendations

In compliance with the requirement of Section 3506(c)(2)(A) of the Paperwork Reduction Act of 1995 for opportunity for public comment on proposed data collection projects, the Centers for Disease Control and Prevention (CDC) will publish periodic summaries of proposed projects. To request more information on the proposed projects or to obtain a copy of the data collection plans and instruments, call 404-639-7570 and send comments to Kimberly S. Lane, CDC Reports Clearance Officer, 1600 Clifton Road, MS-D74, Atlanta, GA 30333 or send an email to omb@cdc.gov.

Comments are invited on: (a) Whether the proposed collection of information is necessary for the proper performance of the functions of the agency, including whether the information shall have practical utility; (b) the accuracy of the agency's estimate of the burden of the proposed collection of information; (c) ways to enhance the quality,

utility, and clarity of the information to be collected; and (d) ways to minimize the burden of the collection of information on respondents, including through the use of automated collection techniques or other forms of information technology. Written comments should be received within 60 days of this notice.

Proposed Project

Human Systems Integration Design Guidelines (MinerFirst) for Improved Mine Worker Safety - New - National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention (CDC).

Background and Brief Description

NIOSH, under P.L. 91-173 as amended by PL 95 -164 (Federal Mine Safety and Health Act of 1977), and PL 109-236 (Mine Improvement and New Emergency Response Act of 2006) has the responsibility to conduct research to improve working conditions and to prevent accidents and occupational diseases in underground coal and metal/nonmetal mines in the U.S.

Mining remains one of the most dangerous occupations in the United States. Despite continued efforts in research and regulation, tragedies like Upper Big Branch (2010) and Sago (2006) highlight the need for additional work that focuses on the human component also known as human systems integration

(HSI). HSI incorporates the needs of any human interaction within the system into the design process to optimize both safety and efficiency of the system. The use of HSI in the acquisition cycle is commonplace in other industries (e.g., the defense and aerospace industries). As an example, the Army has developed guidelines, called MANPRINT, which require all devices to meet standards for usability, wearability, and acceptability. The mining industry currently lacks a similar set of guidelines to ensure both usability by the miner and increased safety of the working environment.

With the adoption of the MINER Act of 2006 as well as health and safety initiatives (End Black Lung Campaign), the mining industry has begun to mandate the increased use of safety devices by mineworkers (wireless communication systems, personal dust monitor, and proximity detection). These devices offer attractive health and safety benefits - improved tracking and communication, real time monitoring of respirable dust levels, and the prevention of accidental crushing by large mobile machinery. However, while the benefits of such wearable devices are easy to understand within their own context, they inevitably increase both the physical and cognitive burden placed on the mine worker who must carry, interact with, and ultimately make decisions with each one of the devices. The physical burden is evident, but the cognitive effect may not be as clear.

Currently, it is unknown how the increased physical and cognitive load that is being placed on today's mine workers will affect their health and safety. A first step to determining this impact is to understand a miner's job from the perspective of the miner. This research project will use an HSI approach to answer a series of questions because HSI is based on the understanding that people are the critical elements within systems and adopting a human-centric perspective of systems increases productivity and safety, while decreasing costs (Tvaryanas, 2006). The goal of this project is to determine: (1) what information is critical for a miner to safely perform his job, (2) what processes (e.g., expertise, decision making, attention, etc.) are necessary for a miner to effectively perform his job, and (3) how do the miner and the machine interact.

This is a multiphase research project. There will be three phases of data collection. Several data collection tools and research methods will be used in each phase of data collection.

In phase I, NIOSH researchers will observe between 10 and 20 underground coal miners while the miners are performing their jobs. The goal of this research method is to observe the tasks and subtasks that occur while specific jobs within the mine are performed to determine which tasks and subtasks are the most challenging for the miner. Researchers will keep observation

notes, and if possible, ask miners questions while they are working. As the second part of phase I, an additional 10-20 underground miners will be asked to take part in a task/cognitive task analysis. During this task, miners will be asked to sequentially describe the steps taken to perform their job. This task will not be completed while the miner is performing his job, but will be described from memory. The underground miners who participate in the direct observation task and task/cognitive task analyses will all be considered experts at their positions, and the positions they work will be those that either rely on the use of energized equipment (e.g., Continuous Miner Operator) or are currently responsible for atmospheric and environmental monitoring (e.g., Fire Boss). Each direct observation session will take no longer than 4 hours, and each task/cognitive task analysis will take approximately two hours to complete.

In phase II of this research, a 30 minute research questionnaire will be administered to no more than 150 underground coal miners. The research questionnaire is designed to assess situational awareness or more specifically what information miners believe is necessary for them to understand and interact with their surroundings and to safely complete their jobs. The research questionnaire will also be used to determine what information miners currently have available to

them, how information is delivered to them, in what format they would like to receive information, and the benefit they see in having information. An additional 30 underground miners will take part in focus groups. Questions similar to those included on the research questionnaire will be asked during the focus groups. The goal of using this research method is to collect more in depth information about the topic from a smaller number of participants. In addition, a Fatigue Risk Management Systems Assessment Tool will be administered to no more than 50 mine personnel familiar with the mines concerns regarding fatigue as well as the fatigue risk management program that may be in use. The results of phase I and phase II will be used to formulate a portion of the initial draft of mining specific Human Systems Integration (HSI) guidelines.

In phase III the experimental research strategy will be used to test usability, changes in cognitive workload, and situational awareness. A series of experiments will be conducted to evaluate how the mine specific HSI guidelines impact the aforementioned constructs. Specific hypotheses will be formulated after phases one and two have been completed. Both underground coal miners and NIOSH employees will be invited to participate in these experiments, which will take place at the NIOSH Bruceton, PA research facility. It is anticipated that each experimental session will last approximately one hour.

The information collected from miners and NIOSH employees to answer these key questions will facilitate the development of mining specific HSI guidelines which are necessary for the planning, development and testing of products to be used by miners. There is no cost to respondents other than their time.

Estimated Annualized Burden Hours

Type of Respondents	Form Name	No. of Respondents	No. of Responses per Respondent	Average Burden per Response (hours)	Total Burden (hours)
Phase I Miners	Task/Cognitive Task Analyses	20	1	2	40
Phase I Miners	Direct Observation	20	1	4	80
Phase II Miners	Research Questionnaire	150	1	30/60	75
Phase II Mine Safety Personnel	Fatigue Risk Management Systems Assessment Tool	50	1	1	50
Phase II Miners	Focus Groups	30	1	1	30
Phase III Miners	Experimental Research Studies	20	1	1	20
Total					295

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Ron A. Otten, Ph.D.
 Director, Office of Scientific Integrity
 Office of the Associate Director for Science
 Office of the Director
 Centers for Disease Control and Prevention

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