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Title: Characterization and Effectiveness of Safety and Health Management Systems in the U.S. Mining Industry

Organization: University of Utah

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Partnerships: National Mining Association
Hecla Mining Company, Luminant Mining Inc., Alpha Natural Resources, Peabody Energy, Jim Walter Resources, Freeport-McMoRan, Arch Coal, Prairie State Energy Campus, Newmont Mining, and CONSOL Energy

Focus Area: Safety and Health Management and Training
Topical Area: Safety and Health Management

Problem Statement and Justification: U.S. mining companies are voluntarily adopting safety and health management systems (SHMS) to supplement regulatory compliance efforts. The impact of these risk-centered systems is promising. Unpublished data from the National Mining Association (NMA) suggests that between 2011 and 2014 only 25% of U.S. mining fatalities occurred in companies utilizing these tools, many of whom were early in their application. However, SHMSs can require significant resources and while their popularity grows, the benefits are primarily anecdotal and qualitative. As U.S. companies continue to adopt SHMSs, or if their use in part or whole is considered for future regulation, it is essential to understand how they work or don't work, and the most effective variables for their development and implementation. It is also important to assess the relative impact of MSHA regulations versus SHMSs on mine safety outcomes. This challenge (and opportunity) is not unique to any U.S. mining sector.

Impact of the Research: This research will establish the first comprehensive characterization of multiple independent variables affecting SHMS development, implementation and performance [define the intervention(s)]; track trailing and leading metrics associated with both SHMS and regulatory compliance performance [longitudinal surveillance]; and provide analysis regarding the empirical and statistical effectiveness relationship of both individual elements and as well as whole SHMS system [intervention effectiveness]. This information will significantly enhance the chronic research gap by simultaneously including multiple active mines across diverse mining commodities, with differing degrees of SHMS implementation, methods and resources. More importantly, these results should have immediate application to the U.S. mining industry, policy makers, and the international mining community.

Objectives and Research Approach: Phase one of the research will begin with a cross-sectional assessment of safety and health management philosophies, strategies, prerequisites, priorities and SHMS approaches, structures, resources and performance metrics at a minimum of 15 U.S. mines. Phase two will involve longitudinal surveillance of parameters identified in phase one and tracking SHMS and regulatory compliance performance metrics for two years to allow for an adequate intervention effect. Phase three is a detailed closing assessment repeating phase one to clearly define the organizational, regulatory, and safety performance impacts of the SHMS. To date, research in these domains has been limited to single interventions that were not specific to U.S. mining with no analysis of intervention effectiveness across multiple combinations of interventions as well as the whole SHMS. No related research has been conducted with adequate access to multiple mines that are simultaneously implementing similar SHMSs, i.e., CORESafety.