

Grant AFC215-41**Title:** Management with Bag Barriers of Dust Explosion Risks in Underground Coal Mines**Organization:** Missouri University of Science and Technology**Principal Investigator(s):** Stewart Gillies**Partnerships:** Arch Coal Inc
Skillpro**Focus Area:** Health and Safety Interventions**Topical Area:** Fire and Explosion Prevention

Problem Statement and Justification: The most significant and powerful hazard that exists in an underground coal mine is a coal dust explosion. Since 2001 disasters due to explosions in US underground coal mines have caused 59 deaths, including 29 deaths in a single mine explosion at the West Virginia Upper Big Branch (UBB) mine in 2010. Many controls have been developed and implemented in different countries to reduce the impact of coal dust explosions. One of the most significant controls internationally is the bag barrier explosion barrier. Explosion barriers have not been adopted in the U.S. because of the erroneous belief that preventative strategies (such as use of inerting limestone dust) will always be 100% effective. In risk management parlance these explosion barriers are a final contingency control for the rare occasion when one or more of the preventative controls fails. This proposed study will utilize the bag barrier explosion barrier and engage the U.S. industry in discussion and development of guidelines for their use in the United States. The use of explosion barriers has over 15 years become well established in coal mining countries outside the U.S.

Impact of the Research: Following the UBB disaster many people have realized that additional defenses are needed to prevent propagation of a methane explosion into a coal dust explosion. Research and revised guidelines specific to U.S. mines are needed to demonstrate the practical application of bag barriers as supplemental protection, with generalized rock dusting to prevent explosion propagations. If this effort succeeds, and the bag barrier system is adopted in the U.S., it will assist in reducing fatalities. Coal mine explosion barrier systems are in use across the developed world. There are clear benefits from saving lives with introduction of explosion barrier systems. The bag barrier explosion barrier system is well established and is a particular barrier which is widely in use in Australia, Britain, South Africa, Germany, Poland and other developed countries. Adoption and use of this system will benefit U.S. miners, mining companies, and society in general.

Objectives and Research Approach: Significant effort will be undertaken at mine sites in undertaking trial explosion barrier installations in U.S. mines and demonstrating the use of bagged barriers as part of a technology transfer effort. Guidelines for use in U.S. coal mines that have for instance, low seams, will be developed. A major part of the project will involve educating mine management and other industry authorities on the merits and advantages and the importance of introducing explosion barriers to the U.S. In parallel, the views of these mine leaders will be sought. National leadership groups drawn from mining corporate leaders, the National Mining Association, MSHA, the West Virginia Office of Mine Health, Safety and Technology, the United Mine Workers Association and NIOSH will be approached for comments at two stages of the project.