
From: MARK CUMMINS [cfire3@msn.com]
Sent: Tuesday, January 24, 2006 12:36 PM
To: zzMSHA-Standards - Comments to Fed Reg Group
Subject: RIN 1219-AB44 New Coal Mine Fire Technology

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We have experimented and used formulas of foaming agents that contain fire extinguishing and fire retarding chemicals that are far more effective than currently available standard foaming agents.

Our experience was first applied to a US Navy CRADA that was commissioned to develop an application system to apply the Navy's chem/bio warfare neutralizing agents in the form of foam. The Navy received Patents for the formulations and our special application systems which are available to us to use in other application such as Carbon Monoxide Encapsulation, and Enclosed Space Air Scrubbing to neutralize toxic gas and particulate matter in the air.

We would really welcome the opportunity to introduce these applications to the mining industry and your help is a great encouragement to us.

**Sincerely,
Mark Cummins**

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There are now 3 new and emerging technologies being applied to actual field applications for coal mine fire control and extinguishment.

These technologies are:

- 1. Inertization with nitrogen and/or carbon dioxide.**
- 2. Nitrogen foam injection.**
- 3. Compressed Air Foam injection mixed with fire retardants and gas displacement with purging additives.**

My company is involved with the pioneering research and development of advanced nitrogen foam applications and the new foam retardant and displacement products.

We have successfully extinguished the Pinnacle coal mine fire using the nitrogen foam injection method and NIOSH has published an informative White Paper report detailing our project.

We believe there is a need to provide some pertinent information about these technologies for the benefit of the coal mine operators and stakeholders. The choice of application will largely depend on what is burning in the mine.

My company is concentrating on the deep seated coal seam fires that are the most difficult to extinguish. Time is a very important factor when considering the best method of fire control in a coal seam. The longer the fire is allowed to burn the more complex the extinguishment effort becomes. When coal burns it creates an abundant amount of ash which can shield the smoldering and buried coal in the seam. This separates the combustion area from the atmosphere in the tunnels of the mine so that ventilation and dilution controls have little influence on the fire. Attempts to dilute the fire gases or eliminate the oxygen are seldom effective because the insulated heat and covered coal/fuel are not exposed to the mine atmosphere.

The ash insulates the coal from the mine atmosphere so oxygen dilution has very little effect on the covered, smoldering combustion of the coal. The covered fire can draw air from cracks and fissures in the buried coal, these cracks and crevices occur naturally in the coal seam and can even be caused by the heating of the rock. The daily barometric pressure can also have an effect on the smoldering coal fire. Old methane de-gassing bore holes in the unburned coal bed can feed oxygen to the seam fire. And there are many other factors that can influence the choice of fire control methods.

When considering the advantages and disadvantages of the different methods available for fire control in a seam fire, the nitrogen gas inertization is the simplest method of fire control but it is the least effective, it takes the longest time to show any results and it is the most expensive of the new fire control technologies. Nitrogen gas injection takes months of drilling and injection with millions of cubic feet of gas and it is very unlikely that the inertization of the mine atmosphere by dilution of the oxygen and fire gases will have any effect on the ash covered coal fire.

By comparison, the nitrogen foam injection is the most complicated and logistically challenging method of fire extinguishment but it is the quickest, most effective and least expensive of the methods for shielded deep seated fires. The foam is a mixture of water and 1% surfactants that are designed to penetrate deep into the ash and will reach the combustion areas of the fire. The foam is inflated with pure nitrogen with zero amounts of oxygen or other gases and the wet, saturating foam will fill the tunnels from the floor to the ceiling to soak out even the hidden fires. The thick density of nitrogen foam is unlike the common fan blown foam used in previous years. Nitrogen foam can be pumped from bore holes at the surface and travel thousands of feet in any direction to fill and saturate the voids.

This application creates a unique way to check for traces of new fire gases. When the foam is allowed to deflate in selected areas, the area will have been purged of all other gases and this allows monitoring equipment to detect any new changes in the mines atmosphere.

NOTICE:

It is likely that some fire fighting companies will offer inertization with nitrogen or CO2 without foam because it is the easiest method. But there may be a temptation to offer this method because there is a great deal of money to be made by providing the method that takes the longest application time. Dilution of oxygen with inert gas is the least effective method of fire control and it will also have to be purged later.

My company is continuing the development of new and more effective methods of mine fire control and will continue providing specialized products and services that will give the miners and rescue teams the new tools to save lives, property and preserve the nation's non-renewable energy resources. We need your input to help us provide the best products and services that can improve the health, safety and well being of our industry.

Mark Cummins