From:	Ellis, Jason <Jason.Ellis@huber.com>
Sent:	Wednesday, March 11, 2015 10:10 AM
To:	zzMSHA-Standards - Comments to Fed Reg Group
Cc:	Shaw, Lane
Subject:	RIN 1219-AB85
Attachments:	RIN 1219-AB85.pdf

MAR 11 2015

Here are some comments for your consideration. Please feel free to contact me with any additional questions.

Regards,

HUBER ENGINEERED MATERIALS

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AB85-COMM-3

A FAMILY OF SOLUTIONS

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March 11, 2015

MSHA, Office of Standards, Regulations, and Variances
1100 Wilson Boulevard, Room 2350
Arlington, Virginia 22209-3939

RE: RIN 1219-AB85 – Health and Safety of Coal Miners

To whom it may concern:

JM Huber Corporation (Huber) submits these comments as solicited by MSHA in via the Federal Register regarding the desire to improve the health and safety of miners and to prevent accidents in underground coal mines.

Huber has stated MSHA's questions in standard font in the subsequent pages for ease of reference. Huber's responses are italicized and in bold following the question.

Please feel free to contact either Lane Shaw (678-247-7437) or myself (678-247-7133) should you have any questions, comments or concerns regarding what Huber has proposed.

We look forward to partnering with MSHA in matters pertaining to the health, safety and well being of our nation's coal miners.

Sincerely,

JM Huber Corporation
Jason P. Ellis, CIH, CSP, CHMM

17. What specific tests should be performed to monitor the quality of rock dust to assure that the rock dust will effectively suppress an explosion in the mine environment?

Mine operators should require Certificates of Analysis with each lot from rock dust suppliers which documents the lot was tested for the following:

a. The percentage of product passing through a 200 mesh screen, and

b. The percentage of surface treatment applied to the product

In addition, the mine operator should receive an annual certification from the rock dust supplier that the product produced for this application:

a. Has been tested for Specific Surface Area and found to be greater than 2,600 square meters per gram

b. Contains less than 1% Combustible Matter

c. Contains less than 4% Silica Content

d. Passes the caking and dispersability requirements when thoroughly wetted and dried

18. What materials produce the most effective rock dust?

White limestone, marble or dolomite produce the most effective rock dust. They naturally contain little to no combustible material and are abundant in supply throughout the United States. The whiter the color, the better the visibility in the mine due to the higher light reflectance of white product. This makes for both a safer (more visibility) working environment and most importantly allows operators and MSHA inspectors to quickly identify areas where float coal is accumulating and re-dusting is required. Gray colored products do not provide these advantages.

19. What are the advantages, disadvantages, impact on miner health and safety, and costs of limiting rock dust to light-colored inert materials, such as limestone and dolomite?

White limestone/marble or dolomite is both abundant in nature and one of the lowest cost minerals available. The limestone or marble should be annually tested for abestiform minerals, but the occurrence of these minerals is rare. The lighter and whiter the rock dust, the more improved is visibility in the mine and the ability for the operator or MSHA inspector to determine areas where float coal is accumulating and require re-dusting. All limestone, marble, and dolomite contain some amount of silica, and a fraction of that silica may be respirable. Most deposits have the silica commingled in the crystal with the calcium or magnesium carbonate, and the silica is difficult to liberate. The testing for respirable silica relies on acid digestion of the surrounding matrix, an operation which does not occur in mines. So while silica is present, the actual amount liberated and free is small. The current testing protocol for silica overestimates the respirable amount.

20. Please provide information on the types of impurities that could degrade rock dust performance. What tests or methods can be used to detect the presence of impurities?

Some deposits contain low levels of graphite, which is combustible. The graphite is subject to the same grinding as the base ore, so a high surface area to mass product is produced. At high enough concentrations, a dust explosion could result. However, graphite concentrations at that high a level would make the ore useless for any other application so the point is moot. A proposed 1% total organic content requirement using a simple ashing procedure (ASTM C637) would assure the graphite would not be an issue.

21. What particle size distribution for rock dust would most effectively inert coal dust? What should be the maximum particle size? What should be the minimum particle size? Please explain and provide the rationale for your answer.

Rock dust effectiveness is primarily a function of particle size. The finer the particle size, the more surface area per unit mass is available to act as a heat sink. Coarser particles have a relatively higher mass/surface area ratio and are less effective in functioning as a heat sink. Any product that passes the 200 mesh screen (75 microns) at a 95% level would be functional in the application. Increased suppression would occur as the particle size is reduced, while the cost of the product would rise due to increased energy usage and equipment wear in grinding the product.

22. Determination of fine particle size of rock dust by sieving may be complicated by static agglomeration. What test methods should be used to measure the size distribution of rock dust to ensure consistent quality? What are the advantages, disadvantages, and costs of these test methods?

The Alpine Jet Sieve method (ASTM D-5158) is most preferred to measure particle size at this range. This is not an expensive apparatus, as the vacuum part alone can be as simple as a ShopVac from any hardware store. Wet screening (ASTM D117) is also an acceptable method, although it is less reliable and subject to some operator technique. Neither technique is expensive nor time consuming.

23. How can the potential of rock dust to cake be minimized? Are subjective and practical tests available to determine the caking potential of rock dust? If so, please explain and provide documentation.

Rock dust caking can be prevented by coating the surface of the particle with a hydrophobic material. This treatment technique is currently practiced for a variety of applications where ground limestone or marble is used, particularly plastic applications. The treatment changes the surface energy of the ground limestone/marble to a surface energy similar to the plastic, thus aiding dispersion.

A simple test for treated product involves taking a small amount and placing it in a container of water. Untreated product will disperse throughout the water and leave it cloudy. Treated material will float to the surface as soon as agitation ceases and remain there, leaving the water clear.

24. Please provide information on how fine particles (less than 10 [mu]m) may increase the likelihood of caking in rock dust.

We have no evidence nor do we believe that fine particles contribute to or encourage caking.

25. Can rock dust be treated with additives that would reduce caking? Would the additive enhance or diminish the ability of the rock dust particles to quench a coal dust explosion and, therefore, impact the effectiveness of the rock dust to inert coal dust? Please provide information on the chemical composition of any suggested additives, the quantities needed, costs, and potential impact on miner health and safety. If available, what areas of an underground coal mine would need to be treated with non-caking rock dust? Please explain and provide the rationale for your answer.

All treatment additives are organic in nature. However treatment levels for a product with 95% passing 200 mesh would be on the order of 0.1 to 0.3% by weight, far below the 1% combustible matter threshold. Their contribution to the total organic load would be negligible.

Current treatment techniques for limestone/marble rely on fatty acids or their metallic counterparts, such as stearic acid and calcium stearate. Any non-toxic organic material that would adhere to the surface and not migrate would be suitable. Fatty acids are found in everyday foodstuffs and cosmetics and are safe.

Costs of manufacture will of necessity increase. The costs of the chemicals itself, new equipment to apply it, the costs of running such equipment, and the costs of new storage silos would need to compensated.

26. Applied rock dust must be dispersible to inert an explosion. What in-mine tests can be used to determine the caking resistance (i.e., dispersibility) of applied rock dust?

A simple test for treated product involves taking a small amount and placing it in a container of water. Untreated product will disperse throughout the water and leave it cloudy. Treated material will float to the surface as soon as agitation ceases and remain there, leaving the water clear.

27. How does combustible material degrade the performance of rock dust? How should MSHA modify the existing specification in the definition of rock dust? Please explain and provide documentation.

Some deposits contain graphite, which is combustible. The graphite is subject to the same grinding as the base ore, so a high surface area to mass product is produced. At high enough concentrations, a dust explosion could result. However, graphite concentrations at that high a level would make the ore useless for any other application. A proposed 1% total organic content requirement using a simple ashing procedure would ensure that graphite and any other organic materials are not an issue.

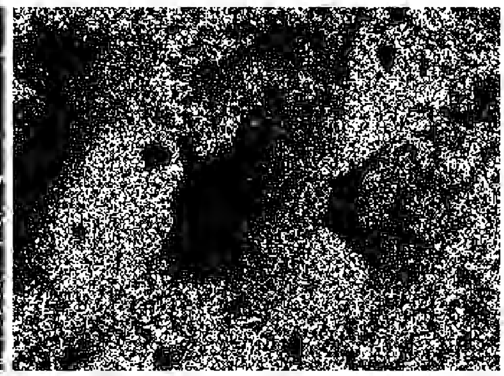
28. How should MSHA modify the existing requirement for free and combined silica in the definition of rock dust? P ease explain and provide documentation.

Most silica in limestone/marble are not present in the matrix as individual particles, but in combination with the calcite with makes up limestone/marble (See Scanning Electron Micrographs for elemental identification of silica and calcium). Precision ground limestone undergoes an air classification step with separates out oversize for return to the mill and further grinding. Since the specific gravity of silica at 2.65 g/cc is virtually identical to calcite (2.71 g/cc), oversize is rejected by the air classifier at the same size fraction. Since silica is more difficult to fracture than limestone/marble, the amount passing through the classifier as product is typically at a larger median particle diameter than the calcite.

A rock dust with 95% passing the 200 mesh will have a typical median particle diameter of around 20 microns, with 20-30% finer than 10 microns.


Electron Image 1


Si Ka1


Ca Ka1

29. How can the respirable particle size fraction of rock dust, i.e., less than 10 mu]m, be limited, while maintaining the effectiveness of the dust to suppress the propagation of a coal dust explosion? Please explain.

It is possible, but not practical to use a secondary air classification process to reduce the 20 to 30% of the >10 micron fines in the 200 mesh product. However, this will of necessity limit the inerting capability of the product as inerting capability is reliant on surface area. The fraction of < 10 micron particles has a disproportionately large percentage of the surface area of the entire product, so removing them would be costly and counterproductive.