From: Jake Wells <Jake.Wells@rosebudmining.com>
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To: zzMSHA-Standards - Comments to Fed Reg Group
Subject: RIN 1219-AB78
Attachments: MSHA Letter re Prox Comments RIN 1219-AB78.pdf; Exhibit A.PDF; Exhibit B.PDF

Please find Rosebud Mining Company's attached comments for RIN 1219-AB78, MSHA's request for information for Proximity Detection Systems for Mobile Machines in Underground Mines.

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AB78-COMM-36

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Mine Safety and Health Administration
Office of Standards, Regulations and Variances
1100 Wilson Boulevard
Arlington, VA 22209

Re: Proximity Detection Systems for Mobile Machines in Underground Mines RIN 1219-AB78

To Whom It May Concern:

Rosebud Mining Company (Rosebud) offers the following comments to the Mine Safety and Health Administration (MSHA) regarding its Proposed Rule and extended comment period for "Proximity Detection Systems for Mobile Machines in Underground Mines," "Request for additional Comments" 88 FR 2285 (January 9, 2017).

Rosebud maintains that its original comments to the proposed rule 80 FR 53070, will need to be addressed before proper implementation of the rule and have attached the comments again for review. (See attached marked as Exhibit A). This response to MSHA's Request for Additional Comments, 88 FR 2285, is not intended to limit or supplant those comments previously submitted. Specifically, MSHA has not addressed the concerns related to the use of proximity detection systems in mines using continuous haulage systems. It would appear that MSHA has hastily sought to implement a rule without sufficient testing or data, and has continued to ignore significant issues addressed by industry, including but not limited to continuous haulage systems.

I. Introduction

In the proposed rule dated September 2, 2015, MSHA designates coal mine operators to equip coal hauling machines and scoops on working sections with proximity detection systems. MSHA defines shuttle cars, ram cars, and continuous haulage systems as coal hauling machines. The agency acknowledged a lack of testing, research, and experience with continuous haulage equipment, like mobile bridge conveyors ("MBC"), and admitted that they anticipate challenges with operation and compliance for such equipment. Previously, Rosebud expressed its concerns for the lack of testing, research and experience with proximity on

continuous haulage in its prior comments attached as Exhibit A. Rosebud exclusively utilizes MBCs in their continuous haulage systems to transfer coal from their continuous miners to the low belt, and unfortunately, the concerns previously raised by Rosebud were not addressed by MSHA in the recent request for information. As Rosebud stated in its initial comments, proposing a rule before determining whether proximity detection on continuous haulage systems will work puts the cart before the horse.

Rosebud's initial comments also detailed historically safe operation of continuous haulage equipment and the fact that accidents related to continuous haulage equipment would not have been prevented by proximity detection.

> "...From 2000 to 2015, out of the twenty-three fatalities involving shuttle cars, coal haulers, scoops and continuous haulage systems, only three were associated with continuous haulage. And of these three fatalities, proximity detection was not necessary to prevent any of them. In 2000, a machine operator was killed when he leaned out of the operators' compartment and was crushed while tramming the equipment. In 2006, a miner fell onto a moving belt and was found lodged between the belt and the mobile bridge conveyor's discharge assembly. In 2006, a miner was killed after leaving his equipment to work on the system's conveyor chain without locking or tagging out the equipment."

To further this point, of the 179 nonfatal accidents involving scoops and coal hauling machines including continuous haulage that occurred from 1984-2014, only fifteen involved continuous haulage or MBCs. Notably, as with the other accidents, most would not have been prevented by use of proximity detection systems. In fact, many of these accidents could have been prevented by current technology or prudent work practices, e.g., had the emergency shutdown bar been used, the machines had been locked out by the operators, or operating the machines with body parts inside the operator compartment.

In short, based on Rosebud's practical experience and MSHA's own data, it is not appropriate or necessary to install proximity detection systems on continuous haulage. And even if it was, MSHA has not conducted sufficient testing to adequately implement a rule.

II. Rosebud's Response to the Request for Additional Comments.

A. MSHA solicits additional comments on whether currently available proximity detection systems are capable of preventing coal hauling machines and scoops from pinning, crushing, and striking miners while maintaining the machine operator's freedom to efficiently perform the job.

Response: Rosebud does not have experience with proximity detection systems on coal hauling machines or scoops. Rosebud is currently in the process of equipping its continuous miners with proximity detection systems to meet the March 2018 deadline for compliance with that rule. Rosebud has twenty mines with twenty-six total continuous miners to equip. For every continuous miner Rosebud operates, there are two to three MBC machines in the continuous haulage system and at least four section scoops that would need to be equipped with proximity detection systems. Accordingly, the number of section scoops and/or coal hauling machines, if necessary, multiplies significantly and must be considered reasonably when establishing a timeframe for compliance with this rule.

MSHA previously received comments that did not support the total de-energization of all functions of the equipment and Rosebud concurs with those comments. Each piece of equipment must be assessed based on its use to determine what functions should be disabled when a miner is in the shutdown zone as opposed to MSHA's prescriptive measures. Differing mining conditions, mine layout, and equipment may necessitate extensive additional research and testing to improve the incorporation of proximity detection systems to prevent errors and nuisance tripping. This research and testing should be done in conjunction with Original Equipment Manufacturers (OEM), proximity detection system manufacturers, NIOSH, industry and MSHA. An emergency system override (ESO) should also be incorporated for circumstances where it is necessary to move the machine. This is consistent with proximity detection on the continuous miner. The operator of a continuous miner must continuously hold the ESO button while they tram the machine. The machine moves very slowly, but it can be retrieved when proximity detection systems typically would not allow it. The dynamic nature of a mining environment could require immediately moving equipment in an unplanned manner. Delays by nuisance tripping could lead to additional hazards for miners operating faulting equipment. This hazard is exacerbated for continuous haulage which measures approximately 225 (two MBC system) to 265 (three MBC system) feet long when linked with the continuous miner.

The parameters for equipment must be specific to the mine. Any rule must consider seam height and critical conditions which exist specific to the underground mining conditions. As these critical conditions change, Rosebud understands that the zoning parameters of the proximity detection may fluctuate which will cause nuisance tripping and may diminish miners' safety. And as noted in David Hales' comments, if there are problems or issues with the proximity system, miners are likely to exhibit increased negative behaviors thereby negating the system's purpose.

Rosebud understands that the intent of proximity detection installed on mobile equipment is to protect workers around the machines while tramming as opposed to those operating the equipment who are in operating locations/compartments. In many of these instances, however, equipment must be attended while tramming from place-to-place, which would require an exemption for workers in the section. Otherwise, Rosebud is uncertain how continuous haulage operators would be capable of carrying a miner-wearable component while in the operator's station or compartment without stopping the machine. In the case of continuous haulage operators, the risk of being struck by a continuous miner while tramming is nearly impossible considering it trams as one machine and especially since they do not operate their equipment remotely.

As shown on the attached drawing, marked as Exhibit B, the distance that would be required to cover the length of the continuous haulage system would likely require multiple proximity systems working together. The three MBC sets depicted measures approximately two hundred sixty-five (265) feet including the continuous mining machine. Along with the length, the width also provides challenges. For example, the widest entry at Rosebud's mines, the beltline, is typically about twenty (20) feet wide. The low belt, which runs beside the continuous haulage and is attached to the dolly, must be a minimum of two (2) feet from the rib and is also about four (4) feet wide. The haulage machines are approximately nine and a half (9.5) feet wide, which leaves two (2) to three (3) feet of total space on each side of the bridge crawlers and the rib/belt. It is unnecessary for anyone to be located between these areas while tramming place-to-place, and there is no benefit of having a pedestrian in these locations.

It is also unknown how the haulage system with proximity detection installed will work together with the continuous miner operator. The front-most bridge that attaches to the continuous miner is approximately five (5) feet wide, but proximity detection systems installed on the continuous miner operator's area will significantly decrease the width, thereby forcing him/her toward the rib and making it nearly impossible to operate the machine safely and efficiently.

MBCs can only travel as fast as the continuous miner and vice-versa. The typical tramming speed is approximately one (1) foot per second or slower (0.68 miles per hour), and is significantly slower than shuttle cars and scoops. Continuous haulage machines attached or detached to the continuous mining machine also do not add visibility hazards. The machines essentially follow one another from cut to cut in concert. They do not go through ventilation curtains abruptly with chances of striking an unaware miner like shuttle cars and scoops.

Machinery such as scoops sometimes requires a miner to touch or be near the equipment to do work. For these reasons, NIOSH has commented that current technology is incapable of providing proper protection along with giving miners the freedom of performing their job efficiently. Sufficient research and testing is necessary for the proximity detection systems to improve the safety and efficiencies of the systems to become more user-friendly and applied practically to meet the needs of the mining community. Of notable concern is that MSHA appears to be willing to push this rule through prior to the 2018 conclusion of research conducted by NIOSH. Rosebud is also unaware whether continuous haulage systems will be a part of the NIOSH study given proximity detection systems on continuous haulage systems have not been applied or tested by MSHA or proximity detection system developers to the best of Rosebud's knowledge. It was confirmed at the Mobile Proximity Detection Workshop on March 22, 2017 that NIOSH still has not researched, tested, or observed proximity detection systems on continuous haulage machines at this point. They claimed to be unaware of any MBCs equipped with proximity detection systems at this time. Accordingly, before MSHA requires MBCs to be equipped with proximity detection systems, adequate research and testing must be completed prior to a final rule.

B. MSHA solicits comments on the types of machine movement a proximity detection system should allow for miners to perform necessary maintenance without exposing them to pinning, crushing, or striking hazards. MSHA also solicits comments on miners' and mine operators' experiences with proximity detection systems that allow a miner to conduct maintenance on a machine without activating the stop movement function.

Response: With the exception of continuous miner operators, Rosebud is not aware of any proximity detection system features that allow miners to perform maintenance. Miner wearable components for the continuous miner operator(s) allow the shutdown zone to shrink only when the cutter heads are running for designated operators only. However, some machine functions such as the tram and

tail swing are disabled when red zones are encountered for operator or other miners. There are a limited number of persons who can be designated as the operator. The continuous miner remote control and proximity detection system interact and allow for the operator to use the ESO function if the proximity detection system would malfunction or the machine would need to be retrieved.

Aside from the continuous miner operator designation when cutting coal, Rosebud does not know of any special parameters for maintenance or separate miner wearable components for the circumstances mentioned by MSHA. The enabling or disabling allowances on the proximity detection systems needs to be clarified to protect the miner adequately. This will also help to clarify the intent of this proposed rule.

C. MSHA solicits additional information regarding how coal hauling machines using proximity detection systems work with continuous mining machines equipped with proximity detection systems while allowing continuous mining machine operators to remain in a safe location.

Response: Rosebud does not have experience with multiple layers of proximity detection systems with other machines, however, the company is concerned with the way systems will interact with one another. Given the potential electromagnetic interference that has been noted with one system operating on continuous miners, the multiplication of potential interference issues could be detrimental to the operation and safe use of proximity detection. As discussed in other comments, multiple proximity detection systems may prohibit miners from entering areas even though such position is necessary to perform the job. A continuous miner operator may be in allowable areas based on the continuous miners' proximity parameters, but the operator may not be able to position himself in that same space to produce coal due to the parameters set on the shuttle cars. These parameters on the shuttle car may need to be set at farther distances when the car is traveling at higher speeds, but they may be inappropriate when the car and continuous miner are trying to produce coal together.

Rosebud anticipates experiencing similar issues noted above if proximity detection is required on their continuous haulage systems. It is unknown to Rosebud how much space will be available for a continuous miner operator to operate the equipment given entry width and location of bridge conveyors. Rosebud's concern is heightened when assessing detached systems as the equipment cables are laying on the mine floor near the operator and helper which may increase potential interference issues. These parameters will also force

continuous miner operators to travel closer to potential rib hazards in an effort to keep away from shutting down the machines.

D. MSHA may consider such a feature and seeks comment on the availability, use, and appropriateness of a temporary bypass feature. MSHA solicits information regarding how this feature could work with existing proximity detection systems and specific benefits or hazards that could result.

Response: Rosebud is agreeable to a temporary bypass feature which would allow operators to operate machinery to move or retrieve the equipment under circumstances when proximity detection systems malfunction, or during maintenance and emergencies. As previously discussed, the continuous miner is able to slow tram while the ESO is engaged. This may also allow for other equipment to operate when miners must be in close proximity to perform certain tasks. Rosebud expects that these risk-based measures would be appropriately studied for each piece of equipment by Original Equipment Manufacturers (OEM), proximity detection manufacturers, NIOSH, and industry prior to the implementation of a final rule.

Indeed, each piece of equipment should be assessed to determine which functions should be disabled when a miner enters the shutdown zone. What is appropriate for one piece of equipment may not be appropriate for another depending on the nature of work and movement in relation to other miners. Rosebud believes these measures should be risk-based per equipment or machine as opposed to MSHA's prescriptive measures. These parameters would be best researched and tested by OEM, proximity detection system manufacturers, NIOSH, and industry in concert with MSHA.

E. MSHA solicits comments on how miners can place themselves in a safe work position to avoid causing nuisance alarms when one or more machines with proximity detection systems are on the working section.

Response: The majority of known nuisance alarms are caused by electromagnetic interference, the presence of metal, and potential deposits in the coal seam itself. Unfortunately, these potential nuisance triggers surround our miners in the working section. Cables from the continuous miners, haulage system, roof bolter, and pumps are effectively laid or hung throughout the working section. The closer these cables are to the proximity detection system on the continuous miner, the higher the potential for the nuisance alarms. That said, the more

proximity detection systems that exist in the working section, the greater the likelihood there is for nuisance alarms due to interference. Based on comments from the San Juan Mine where miner-wearables were causing nuisance tripping from 150 feet away, it would appear that these systems are not "game-ready". During the partnership meeting on March 22, 2017, NIOSH researchers stated that nuisance alarming occurred up to ten times during the loading of one shuttle car when observed underground. They also noted that it took approximately fifteen minutes to correct each alarm condition. NIOSH has also acknowledged that the miners themselves have to openly accept the proximity detection system for it to be effective which will only happen without nuisance alarms. If a miner has to constantly focus on repositioning himself from one safe place to another to appease the system, he/she is more likely to react negatively toward the system.

F. MSHA is interested in receiving additional information on miners' and mine operators' experiences with the effect that proximity detection systems have on miners' and machine operators' situational awareness and any examples where reliance on proximity detection technology may cause the miner to develop work practices that introduce additional hazards.

Response: Rosebud has trained their workers properly with respect to their situational awareness; however, it is a concern of Rosebud's that these workers will only rely on proximity detection and let their guard down and expect a machine to stop prior to coming into contact with them. The company trusts that appropriate personnel will properly maintain the equipment to the best of their ability, but, if an interference issue arises without warning and the employee trusts the proximity detection system to work and it does not, it could result in injuries.

The proposed rule posits that the proximity detection system is a guard that will stop a machine from contacting and injuring a person. Proximity detection is not, however, like physical guarding that you can see. A person does not need to perform multiple tests day-after-day to assure the physical guard is in place and will protect a person adequately. If a guard is out of place the hazard could be identified quickly. At this time, even manufacturers of the system cannot guarantee that their product is adequately guarding someone from a hazard at all times due to interference and the lack of testing or experience with equipment such as continuous haulage. Rosebud is concerned that with time, these "invisible guards" may give miners a false sense of security and reduces their reliance on training and situational awareness.

G. MSHA solicits comments on the methods and practices mine operators have used or could use to identify sources of electromagnetic interference. MSHA is also interested in receiving information on the actions an operator has taken or could take to prevent such interference and how electromagnetic interference can be mitigated in instances where a miner needs to wear multiple miner-wearable components because different proximity detection system models are operating on a working section.

MSHA solicits information and data from mine operators and proximity detection system manufacturers on best practices to minimize the effects of these non-electrical interferences.

Response: Nuisance alarms/interference can exist when there is a presence of metal which has necessitated minimum distance recommendations from miner wearable components and electronics, tools, and other metallic objects. Miners wear the miner-wearable components on their chest or belt a distance away from the many other tools and instruments they are required to wear. Often times, however, it is not possible to keep such components from contacting metal or tools, especially at Rosebud's mines were the mine height is 38 - 48" and workers are often required to crawl. The amount of instruments workers are required to carry, (i.e. SCSR, PDM, Radio, Locator pad, tools) especially in low coal seams where they are required to crawl affect even the most prudent miner when operating in tight conditions. Although miners make diligent efforts to separate their equipment it can be impossible at all times, which may lead to an unsafe condition for our miners.

Unfortunately, it is also not realistic to expect the industry's mining engineers to mitigate all electromagnetic interference such that it will never occur. Underground mining is too dynamic with conditions constantly changing, including the ever-changing placement of machines, cables, and other equipment. Ideally, these electromagnetic interferences would have been studied and mitigated through proper research and testing prior to proposing the rule. The instruments (detectors, radios, tracking and communications, cables, metal, etc.) emitting potential interference have existed in industry for years without interruptions.

In terms of best practices to minimize the effects of non-electric interference: the purpose of wire mesh or metallic objects is typically to protect miners from falls of roof/rib, a significant hazard to miners. Rosebud utilizes T-3, T-5, wire mesh, I-Beams and H-Beams as roof support depending on circumstances and conditions. We have established best practices to install these

protections to adequately protect our miners and any deviation from this would shortcut our roof/rib control which we would and should not consider, especially to minimize the effects of interference with proximately detection systems that appear to be unnecessary.

H. MSHA solicits comments on the cost and availability of, and experience with, any proximity detection system feature or other technology that automatically alerts the miner or machine operator when the miner-wearable component or proximity detection system is not functioning properly due to electromagnetic interference.

Response: Rosebud does not have experience with the magnetic field sensing coils and this feature. Others within industry have used a system with this feature and anecdotally said it is a nuisance which sensed magnetics and alarmed continuously. This would be the same as hearing a back-up alarm all day long—after a short while you stop noticing it.

I. MSHA solicits comments on how warning and shutdown zones can be checked, or tested, without putting machine operators at risk.

Response: Rosebud has not experienced issues with how warning and shutdown zones are checked and tested by manufacturers' recommendation on their existing proximity detection systems. On the continuous miner, the operator must walk around the machine to ensure the zones are in place prior to the static and dynamic testing. The static and dynamic testing is being performed with the operator out of harm's way and the locator as the testing device. This ensures that the functions are working properly. That said, Rosebud believes that additional testing is necessary to adequately answer MSHA's questions concerning riskless checks and testing.

III. Conclusion

Rosebud Mining Company does not believe that the proposed rule enhances the health and safety of coal mines. At this time, proximity detection systems have not matured to a point where they can be integrated and effectively used in coal mines. As stated in its initial comments, nuisance alarms and interference issues remain a significant problem not yet solved nor sufficiently explored. Miners will become complacent in hazard awareness relying on proximity systems to protect them, which is a major cause for concern as the technology is not fully developed

and needs additional research and testing to be proven adequate before a final rule is implemented.

The Mobile Proximity Detection Workshop on March 22, 2017, detailed testing that occurred under ideal conditions, but even with that, the proximity detection systems showed that much improvement is still necessary. It would be prudent for industry to work the flaws and deficiencies out of the continuous mining machine's proximity detection systems before implementing multiple systems to the working sections. It makes little sense to burden the industry with more proximity regulation before sufficient testing and research. Rosebud's initial comments detailed the impropriety of the proposed rule particularly with respect to mines utilizing continuous haulage systems. MSHA has not sufficiently addressed those concerns and therefore Rosebud opposes the implementation of a rule at this time.

Sincerely,

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