From: Jim Barrett [mailto:jim.barrett@venturedesignservices.com]
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Subject: Public Comments in Response to MSHA PPL on MINER Act Wireless
Importance: High

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COMM-19

Public Comments pertaining to:

Guidance for Compliance with Post-Accident Two-Way Communications and Electronic Tracking Requirements of the MINER Act

as published in draft form on 12/12/2008 (Program Policy Letter No. P08-)

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Thank you Ms. Silvey, and others within MSHA, for the opportunity to provide comments on this important subject. My comments are based upon my 28 year background as an electrical engineer and computer scientist managing the development of state-of-the-art wireless communication systems for Hewlett Packard, Agilent Technologies, and Venture Design, culminating most recently in the creation of the MineTracer system for wireless tracking and 2-way communications in underground coal mines.

We were well along in the invention process for MineTracer prior to the Sago accident, and our earliest MineTracer system has been operating reliably and capably in full-time service at the Big Branch mine in West Virginia for 18 months. The full-scale multi-mile MineTracer system in that installation (and in other locations where it is installed) well demonstrates the best intentions of the MINER Act of 2006. The full-scale system has been witnessed by many within MSHA including Richard Stickler, Dave Chirdon, Robert Hardman, Wes Schumaker, Juliette Hill, and others. For an excellent brief overview of the system I encourage you to view the 10-minute video clip at
http://ventureminetracer.com/intro.html
which features West Virginia miners sharing their first-hand accounts of using MineTracer in their mines.

I will predominately focus my opening comments here on the overall approach that MSHA seems to be taking with this PPL, and suggest a few changes based on my knowledge of the subject. I will then supplement my remarks with a detailed written section-by-section comment on the proposed rule itself.

I would like to qualify my remarks with an earnest statement of good will toward MSHA and toward all who are involved in implementing the MINER Act of 2006. Commentary in this context will always appear contentious; that cannot be avoided. However, I want to explicitly say up-front that I do not pretend to have all the answers to these complex subjects, nor do I claim any monopoly on understanding the right way to do things. I honor the fact that there are many considerations and many caring career professionals who have unique points of view as well. I only ask that my professional experiences and insights on these subjects be afforded their rightful respect and sober consideration. The

stakes are truly high in this endeavor.

My first observation is that MSHA has done a good job in this PPL of assembling the salient characteristics on which these systems should be judged for suitability. This is a tremendous accomplishment, and one that takes a huge step toward providing the industry with information that has been sorely needed for months.

My second observation is that MSHA has chosen to provide what is essentially very soft guidance in the form of a "Program Policy Letter," as opposed to a firm Federal Regulation. This is opposite to the approach just taken with the refuge chambers and most other topics of importance in mine safety. When the stakes are this high, and when life-honoring compliance will otherwise suffer, firm regulations are the norm. Soft "guidance" of the type presented in the PPL is problematic for a number of reasons; most notably because it is subject to wildly variable interpretation and is non-binding. This leaves the industry without leadership when the opposite is much needed from MSHA at this time. This new wireless technology is not well understood by the mining community, and that begs for more not less leadership on the part of MSHA. To ensure that the hundreds of millions of dollars to be spent by the mines in pursuit of MINER Act compliance is well spent, and to ensure that the goal of safeguarding human life is met, it is imperative that MSHA firmly prescribe a minimum set of performance based requirements. These need to be clear rules (Federal Regulations), articulated in the specific language of a federal regulation that elaborates on (but does not replace) the MINER Act. The alternative is a continuation of confusion and slow adoption across the industry, together with the "wild west" practice of misrepresentation by some unscrupulous vendors as to the true capabilities and suitability of their products. It is recommended that MSHA follow a similar process to that just completed for Refuge Chambers, and firmly define the requirements for wireless communications and tracking in the Federal Register.

An example with important parallels is to look at what is needed for intrinsic safety approvals of electrical systems. The example is similar in that the stakes are very high and the details are not well enough understood across the industry to suggest that ad hoc self-management under soft guidance would adequately safeguard lives. In intrinsic safety, the necessity is for tight regulations, with thorough evaluation by MSHA engineers, as the only way to ensure that major problems do not occur. It should not be any different with wireless performance under the MINER Act.

My next observation is that MSHA is incorrectly stating that "this technology does not yet exist" to do wireless communications and tracking as envisioned by the MINER Act. The exact statement from the PPL is "As of December 12, 2008, approved electronic tracking systems are available. However, fully wireless communications technology is not sufficiently developed at this time, nor is it likely to be technologically feasible by June 15, 2009." The second sentence is patently false. The MineTracer system in its present form, as fully approved by MSHA today, is capable of delivering every requirement of the MINER Act (and including every requirement in this PPL) today, and even without wires underground if desired. The latter is achievable in the standard configuration of MineTracer for small to mid-sized mines in which 100% peer-to-peer wireless is

accomplished from the surface to the underground workings (no backbone wire). Furthermore, any one of three optional configurations of MineTracer having "no wires underground" can be done at any time in even the largest mines. And these optional configurations do not deviate from the MSHA approval (30CFR23) that exists for the system today. These "no wires underground" configurations are not done as the standard offering in large mines only because the developers strongly believe that the use of the standard fault-tolerant and self-healing backbone wire is a more reliable and survivable approach in a large mine. But the capability to provide "no wires underground" exists now; it is proven, it is economical, it is MSHA-approved under 30CFR Part23, and it is available in high production volume from a world-class manufacturer. While it is good that MSHA is pushing the industry to immediately adopt the best available technologies, and to turn away from its tendency to lock up on the definition of fully wireless, the premise stated that "the technology does not exist and may not exist" is untrue. It would be better to simply say that several suitable products are available, and that the industry should no longer concern itself with the unhelpful debate about "fully wireless".

An unacceptable consequence of the claim that "wireless does not exist" is that it is the foundational basis on which the present guidance document lays out requirements that are largely written around old and/or poor performing technologies. Especially alarming is the fact that these older technologies are not less expensive for the mines to any significant degree. It would be far better to abandon the false premise, and to instead focus on performance based specifications that elaborate on the MINER Act intention to safeguard human life. MSHA and Congress have stated their goal of welcoming innovation. A sensible approach is to dictate hard requirements that are performance based NOW, and allow the processes of capitalistic competition and innovation to evolve new/better/cheaper methods of meeting these performance requirements into the future. For the present, it is recommended that MSHA immediately correct this misinformation since it stifles adoption by the mines of very excellent solutions that are here now, approved, reliable, and economically available today. The guidance as written encourages the opposite of MSHA's stated goals about innovation to improve mine safety, and instead biases the mines toward adoption of 40 year old and poor performing technology.

My final summary comment is the most important and will be described in the following paragraphs. It is that the proposed guidance establishes very weak expectations on a couple key areas that go to the heart of whether men will live or die in future mine accidents like Sago. The poor accuracy requirements for tracking in escapeways is a very serious problem, as is the minimal expectation for post-accident standby power. It is recommended that these expectations be tightened according to specific remarks included below in the section-by-section commentary. In summary, however, here is an overview of why these particular requirements fail to enforce the life-honoring spirit of the MINER Act.

MSHA's present guidance expects accurate location tracking in working sections but not in escapeways. But ALL areas that are frequented by miners, and most especially escapeways that will be used for escape from mine accidents, should be covered by continuous accurate tracking. The way the spec is written now, MSHA suggests 200 feet

accuracy in working areas (sensible) but only 2000 feet gateways in escapeways. Such poor performance dramatically increases the risk to both victims and rescuers in the aftermath of accidents. It is a fact that MSHA-approved technology is available today that can resolve accuracy to +/-100 feet or better in escapeways AND in working areas, and for no substantive price premium. Private industry has spent many tens of millions of dollars responding to the MINER Act mandate to create this accurate tracking. Additionally, Congress allocated taxpayer money in the amount of $10million dollars that was spent in-part developing technology capable of +/-50feet across an entire mine (50 feet was the contract award criteria as set by NIOSH as the sensible expectation). Venture's MineTracer developers took these same MINER Act sensibilities to heart and developed a +/- 75 feet capability that is very economical for the mines.

As a case study of why the 2000 feet gateway spec is such a serious problem, consider the following. The 12 Sago victims initially attempted to escape via the escapeway (a totally expected action in such an emergency), but they were turned back by poor visibility. Had they continued and then been overcome or stuck somewhere in the escapeway, their location would have been basically unknown under the present MSHA guidance (+/-2000feet at best, or a 4000foot zone given the crude definition in the guidance concerning directionally aware tracking). These 12 men, plus an additional 17 men who were elsewhere underground at the time, would have proceeded with their escape attempts without the mine office knowing their whereabouts to any better than a 4000 foot zone around where they were last seen (i.e. the 29 men were not on a working section for a time during the unfolding event). Such poor performance will likely contribute to unacceptable loss of life in similar future accidents.

Another case in point involves a fire boss who was crushed and incapacitated a year ago by roof-fall in a mine where MineTracer is now installed (Jacob Mine). Only by great fortune did he have another man with him that day who came to his aid (normally he travels alone). Had the present MSHA guidance been implemented in that mine at the time of that accident, the outcome would likely have been fatal. The miner states that with the MineTracer system as it is presently installed in that mine, "The system would have saved my life. They would have gotten help to me and I wouldn't have to lay there worrying about dieing" (he was pinned down and bleeding profusely from a severed finger).

On the issue of standby power for post-accident operation, the PPL proposes levels that are far short of what is needed to safeguard lives. It is recommended, for life saving utility, that 48 hours of standby power be the absolute minimum for which the wireless systems will maintain continuous operation "post-accident" (after mine AC power has been interrupted by the accident event or shut down). This should apply to both infrastructure and the portable devices carried by the miners, since the infrastructure accomplishes nothing unless the portable devices are also operational. The present guidance calls loosely for 24 hours for the system infrastructure and only 4 hours for the portable devices (8 of 12 hours would already be gone if an accident occurred near the end of a shift)! This requirement appears to be written around walkie-talkie handsets as opposed to being a requirement that attempts to honor what is necessary to preserve human life after a mine accident. There were 41 hours of post-accident rescue at Sago. There were 3 days at

Quecreek. There were many days at Crandall Canyon. The new Federal Regulations for rescue chambers require 96 hours of post accident refuge. It is not sensible that the portable wireless appliances under the MINER Act would operate for only 4 hours beyond the length of a shift. It is not sensible that the wireless infrastructure would operate for only 24 hours, which is 17 hours short of when Randal McCloy was found barely alive. MineTracer provides 48 hours standard (and optionally 96 hours) of continuous operation of all system infrastructure and all portable appliances. This capability is economically available to the mines in volume today, and is MSHA-approved in every nuance. Other manufacturers have responded similarly with life-honoring standby time in their product designs as well.

In support of my comments I would like to say that I have interviewed many mine rescue professionals from around the world, including members of MSHA's own rescue team. I performed these interviews primarily at the International Mine Rescue competitions held in the last three years in PingDingShan China and in Nashville TN. I attempted an unbiased approach using open-ended questions, and sought to understand what characteristics are needed in wireless tracking and communications to maximize success in mine rescue. A related subject I explored were characteristics that reduce the risks taken by rescuers themselves in the life-saving rescue missions. Among the many inputs I received, two things stood out that have driven our development of MineTracer, and they color my response to MSHA's PPL guidance. The first is that "time is life", and the faster a victim receives aid the better their chances of survival. The second is that knowing accurately where survivable victims are located is the single most important determinant of how effective borehole augmentations and other rescue procedures can be. All of their inputs advocate strongly for location tracking precision in the range of a couple hundred feet or better. And communicating/knowing the likely status of victims for many hours post-accident allows them to judiciously manage their own risks as rescuers.

In closing, I want to say again that I make these comments under no illusions that they represent the only or best conclusions. However, as a lifetime professional in wireless communications R&D, and a person who has been intimately involved in the creation of a state-of-the-art product to address the MINER Act, I have considerable rationale that I believe is well justified. My hope is that the best solution for the mines and miners will be found through the most open and inclusive evaluation of expert opinion from all knowledgeable stakeholders. To that end I appreciate this opportunity to present mine.

My detailed section-by-section comments are attached.

Thank you.

Jim

Detailed Section-by-Section Comments pertaining to:

Guidance for Compliance with Post-Accident Two-Way Communications and Electronic Tracking Requirements of the MINER Act

as published in draft form on 12/12/2008 (Program Policy Letter No. P08-)

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These comments follow the order of the subject's occurrence in the published proposal.

SUPPLEMENTARY INFORMATION:

I. Background

On June 15, 2006, the President signed the MINER Act of 2006 (Pub. L. 109-236). The MINER Act requires that each underground coal mine operator have an approved Emergency Response Plan (ERP) that includes post-accident communications and post-accident tracking. Further, the MINER Act requires that by June 15, 2009, each operator must submit a plan that provides for ``a post-accident communication system between underground personnel and surface personnel via a wireless two-way medium and an electronic tracking system that permits surface personnel to determine the location of any persons trapped underground, or set forth within the plan the reasons such provisions can not be adopted''.

II. Overview

Comment 1 concerning the statement:

As of December 12, 2008, approved electronic tracking systems are available. However, fully wireless communications technology is not sufficiently developed at this time, nor is it likely to be technologically feasible by June 15, 2009.

The second sentence is patently untrue. The technology does indeed exist today, it has been proven robust and reliable for many months in full-scale deployments in underground coal, it is fully MSHA-approved, it is economical (consistent with MSHA's own estimates of the cost of alternatives), and is available in high volume from world class manufacturers.

In accordance with Executive Order (EO) 12866 on Regulatory Planning and Review, as amended by EO 13422 (January 18, 2007), and the Bulletin for Agency Good Guidance Practices (Good Guidance Bulletin), adopted by the Office of Management and Budget, MSHA has issued a

PPL to provide mine operators guidance for implementing MINER Act requirements for wireless communications and electronic tracking systems by June 15, 2009. Specifically, the guidance addresses electronic tracking systems and acceptable alternatives to fully wireless communication systems for use in mine emergencies. The guidance represents MSHA's current thinking with respect to two-way communication and electronic tracking for use in mine emergencies.

Comment 2 concerning the statement:

In accordance with the Good Guidance Bulletin, MSHA has made the PPL on ``Guidance for Compliance with Post-Accident Two-Way Communications and Electronic Tracking Requirements of the MINER Act'' publicly available on the Agency's Web site for comment. MSHA is also making available on the Agency's website preliminary estimates of costs associated with implementing the MINER Act requirements under the guidance in the PPL. MSHA invites the public to comment on the guidance in the PPL, as well as the preliminary cost estimates.

The MineTracer Communications and Tracking System cost when computed as a total outlay for a mine is equal to or less than the MSHA estimates, even when configured for the higher performance advocated in my PPL comments. There should be no valid reason for MSHA to expect anything less than the highest performance that will honor and safeguard human lives.

MSHA's draft PPL and preliminary cost estimates are posted on the Internet at http:// www.msha.gov/regs/complian/pplmen.htm. You may view all comments on the Agency's Web site at http://www.msha.gov/currentcomments.asp.

Comment 3 concerning the statement:

MSHA will consider initiating rulemaking on requirements for wireless post-accident communication systems and electronic tracking systems in the future. In the interim, MSHA is issuing the PPL to respond to underground coal mine operators' requests for guidance to assist them in implementing these requirements of the MINER Act in a timely and effective manner. MSHA will use comments received to help the Agency determine the most appropriate course of action.

It is recommended that this work should be made into formal rules now as explained in my earlier introductory comments. This set of requirements must not remain as soft guidance nor languish in rulemaking for many months or years. We recommend firm rules in the Federal Register under the appropriate CFRs.

Richard E. Stickler,
Acting Assistant Secretary for Mine Safety and Health.
Effective Date:----------
Expiration Date:----------

Program Policy Letter No. P08-

From: Kevin Stricklin, Administrator for Coal Mine Safety and Health;
Mark Skiles, Director of Technical Support.

Subject: Guidance for Compliance with Post-Accident Two-Way

Communications and Electronic Tracking Requirements of the Mine Improvement and New Emergency Response Act (MINER Act).

Scope

This program policy letter (PPL) is intended for Mine Safety and Health Administration (MSHA) personnel, equipment manufacturers, repair facilities, underground coal mine operators and independent contractors, miners' representatives, and other interested parties.

Purpose

This PPL is a general statement of policy that provides mine operators guidance in implementing: (1) Alternatives to fully wireless post-accident two-way communication between underground and surface personnel and (2) electronic tracking systems, both of which are required by the MINER Act. The two-way communication alternatives (or ``partially wireless'' systems) include infrastructure underground to provide untethered communications with miners.

Comment 4 concerning the statement:

Policy

The following guidance is provided to assist mine operators in developing post-accident two-way communication between underground and surface personnel and electronic tracking for their Emergency Response Plans (ERPs), as required by the MINER Act. The MINER Act requires, by June 15, 2009, a plan be submitted that provides for a post-accident communication system between underground personnel and surface personnel via a wireless two-way medium and an electronic tracking system that permits surface personnel to determine the location of any persons trapped underground. If these provisions cannot be adopted, the MINER Act requires that ERPs must set forth an alternative means of compliance that approximates, ``as closely as possible, the degree of functional utility and safety protection provided by the wireless two- way medium and tracking system'' referenced.

It is recommended that a deadline for implementation be specified. The date of June 15 speaks to a "plan submission" with no guidance whatsoever on how soon the technology should be installed and operational. There are no fewer than ten Wireless Communication and/or Tracking Systems on the MSHA Approved list today.

With respect to tracking, because electronic systems currently are available and MSHA approved, new ERPs and revisions to existing ERPs should provide for electronic tracking of persons underground.

Comment 5 concerning the statement:

However, because fully wireless communications technology is not sufficiently developed at this time, nor is it likely to be technologically feasible by June 15, 2009, this guidance addresses acceptable alternatives to fully wireless communication systems. New ERPs and revisions to existing ERPs should provide for alternatives to fully wireless communication systems.

The premise in the first sentence is patently false. However, it is good that MSHA is

telling the industry, in-effect, to move forward with adopting the excellent technology that exists now, but the fact remains that fully wireless does indeed exist now and is economically available in volume today. For those who persist in the notion that the MINER Act expects Through-The-Earth (TTE) technology where radio communication is transmitted through rock and soil, it is true that the technology is not sufficiently developed. Anyone who expects that some day an underground miner will be able to carry a small cell phone device with long battery life and allowing two-way voice communications with the surface through rock, soil and water, without any underground infrastructure, needs to understand that this will not happen in any of our lifetimes. However, for the wireless systems that operate within the mine entries (tunnels), the technology absolutely does exist to do that with high performance and without any wires underground; and it is well proven and economically available in volume today. It is also worth noting that the term "fully wireless communication technology" does not exist in the MINER Act and is in fact a construct of this very guidance document. The MINER Act explicitly says "via a wireless two-way medium".

Comment 6 concerning the statement:

This guidance represents MSHA's current thinking with respect to two-way communication and electronic tracking for use in mine emergencies. It does not create or confer any rights for any person and it does not operate to bind mine operators or any other members of the public. Mine operators can use an alternative approach or system to provide two-way communication or electronic tracking, if the approach or system satisfies the requirements of applicable statutes and regulations. If you are a mine operator, miners' representative, or miner and want to discuss another approach or system, you may contact the MSHA District Manager for the area in which the mine is located. Other interested parties may contact the individuals identified in this PPL. References to the District Manager in this PPL refer to the Agency's existing consultative process for approving mine plans, as opposed to the process for enforcement decisions related to citations.

This statement negates the value of the rest of the content of the guidance. The purpose of this guidance is to advance the understanding of what is required to comply with the MINER Act, so as to help the industry adopt systems that will have reasonable likelihood of performing well in the event of a disaster. Leaving ad hoc forces to play out will not achieve the goals or intent of the MINER Act.

Two-Way Communication System

Comment 7 concerning the statement:

By June 15, 2009, in accordance with Section 2 of the MINER Act, until fully wireless systems are available, operators must set forth in their Emergency Response Plans the reasons that they are proposing alternative systems, that is, that wireless systems are not available, and provide an alternative that approximates, as closely as possible, the degree of functional utility and safety protection provided by a wireless two-way communications system. While operators and District Managers must consider mine-specific circumstances in determining appropriate two-way communications systems, this guidance outlines the features MSHA believes would best approximate the functional utility and safety protections of a fully wireless system, given the limitations of current technology. As noted, operators and others may propose other approaches or systems, and the District Manager will exercise his discretion in evaluating them. Communications

systems that are already in use may need to be updated to comply with the MINER Act requirements to approximate the utility and safety protections of a fully wireless system.

This statement appears to nullify the intent of the MINER Act and the very guidance within this document. It furthers the egregious misrepresentation that the technology does not exist, and adds to the uncertainty and confusion in the industry today. The statement advises the mine operators, in-effect, to use that untrue basis as their reason for submitting a mine plan specifying alternate and even inferior systems.

1. General Considerations--An alternative to a fully wireless communications system used to meet the requirements of the MINER Act for post-accident communication either can be a system used for day-to- day operations or a stored system used in the event of an accident. Examples of currently available technologies that may be capable of best approximating a fully wireless communications system include, but are not limited to, leaky feeder, mesh and medium frequency systems. Any alternative system generally should:

a. Have an untethered device that miners can use to communicate with the surface. The untethered device should be readily accessible to each group of miners working or traveling together and to any individual miner working or traveling alone.

b. Provide communication in the form of two-way voice and/or two- way text messages. If used, pre-programmed text messages should be capable of providing information to the surface necessary to determine the status of miners and the conditions in the mine, as well as providing the necessary emergency response information to miners.

c. Provide an audible, visual, and/or vibrating alarm that is activated by an incoming signal. The alarm should be distinguishable from the surrounding environment.

d. Be capable of sending an emergency message to each of the untethered devices.

e. Be installed to prevent interference with blasting circuits and other electrical systems.

2. Coverage Area

a. The system must provide coverage for each working section in a mine including all intersections.

Comment 8 concerning the statement:

b. The system also generally should provide continuous coverage along the escapeways and a coverage zone both inby and outby strategic areas of the mine, such as belt drives and transfer points, power centers, loading points, refuge alternatives, SCSR caches and other areas identified by the District Manager. While a coverage zone of 200 feet inby and 200 feet outby strategic areas normally should be adequate, the District Manager may require longer or shorter distances given circumstances specific to the mine.

The stipulation requiring <u>continuous coverage</u> in escapeways is excellent. It deserves further elaboration to say that both primary and alternate escapeways should be covered continuously, and that the redundancy requirements mentioned later also apply.

i. The District Manager may approve alternative coverage areas to those areas identified in 2(b), such as adjacent entries, for reasons such as radio frequency interference or other factors that may reduce the coverage area at the identified strategic areas.

ii. Miners should follow an established check-in/check-out procedure or an equivalent procedure when assigned to work in bleeders or other remote areas of the mine that are not provided with

communications coverage.

3. Permissibility--The communication system must be approved by MSHA to comply with 30 CFR part 23 and applicable policies.

Comment 9 concerning the statement:

4. Standby Power for Underground Components and Devices

a. Stationary components (infrastructure) generally should be equipped with a standby power source capable of providing sufficient power to facilitate evacuation and rescue in the event the line power fails or is cut off. In many mining situations, at least 24 hours of standby power based on a 5% transmit time, 5% receive time, and 90% idle time duty cycle (denoted as 5/5/90) generally should be adequate, but mine-specific conditions may warrant more or less standby power capability.

b. Portable devices, such as hand-held radios, generally should provide sufficient power to facilitate evacuation and rescue following an accident. In many mining situations, at least 4 hours of operation in addition to the normal shift duration (12-hour minimum total duration) based on a 5/5/90 duty cycle generally should be adequate, but mine-specific conditions may warrant more or less capability.

The standby power/time for both infrastructure and portable devices should be the same number. One is not useful without the other. The Sago rescue went on for 41 hours and should be a major indication that what is specified here in the PPL is inadequate. It is recommended in the strongest terms possible that 48 hours of continuous operation is needed for both infrastructure and portable devices.

5. Surface Considerations

a. The communication system generally should include a line-powered surface component with a standby power source to ensure continued operation in the event the line power is interrupted.

b. The surface components of the communication system should be located at the communication facility required under 30 CFR 75.1600-1 where a person who is always on duty when persons are underground can receive incoming messages and respond immediately in the event of an emergency. The person should be trained in the operation of the communication system and knowledgeable of the mine's Emergency Response Plan.

Comment 10 concerning the statement:

6. Survivability

a. The post-accident communication system generally should provide redundant signal pathways to the surface component.

b. Redundancy can be achieved by multiple systems installed in multiple entries, or one system with multiple pathways to the surface; provided that a failure in one system or pathway does not affect the other system or pathway.

c. Redundancy means that the system can maintain communications with the surface when a single pathway is disrupted. Disruption can include major events in an entry or component failure.

d. If system components must be installed in areas vulnerable to damage (such as in front of seals), protection against forces that could cause damage should be provided.

7. Maintenance

a. The equipment manufacturer generally should provide a maintenance schedule and checklist to the mine operator.

b. The mine operator generally should:

i. Establish and follow a procedure to provide communications during system or component failures in the event that an accident occurs before the failure can be corrected.

ii. Check the standby power and functionality of the system and the untethered devices on a weekly basis as required by 30 CFR 75.512-2.

iii. Follow the manufacturer's maintenance recommendations.

This is all excellent guidance on survivability, and will definitely help save lives.

Electronic Tracking System

Approved electronic tracking systems are available. While operators and District Managers must consider mine-specific circumstances in determining an appropriate electronic tracking system, this guidance outlines features MSHA believes would provide the protection contemplated in the MINER Act in many underground coal mining environments. As noted, operators and others may propose alternative approaches or systems, and the District Manager will exercise his discretion in evaluating them.

1. By June 15, 2009, a plan must be submitted that provides for determining the location of persons underground using an electronic tracking system pursuant to 30 U.S.C. 876(b)(2)(F)(ii).

2. Performance

a. While the required capabilities of a particular tracking system will depend on mine-specific circumstances, an effective electronic tracking system generally should be capable of:

Comment 11 concerning the statement:

i. Determining the location of miners on a working section including all intersections to within 200 feet.

ii. Determining the location of miners in escapeways at intervals not exceeding 2,000 feet.

iii. Determining the location of miners within 200 feet of strategic locations such as belt drives and transfer points, power centers, loading points, refuge alternatives, SCSR caches, and other areas deemed appropriate by the District Manager (example: A reader is placed 200 feet or less from each strategic location).

This expectation of 200 feet is good but is imprecisely worded. The 200 feet should be stated precisely as +/- 100 feet absolute accuracy from any reported location. The 2000 foot requirement in escapeways will be extremely ineffective in safeguarding human life in an accident. The 2000 foot requirement is also imprecisely worded and opens up the possibility of the unsavory interpretation that a non-directional single-reader gateway every 2000 feet is adequate, which creates a 4000 foot zone of uncertainty for a miner who traveled up to near a gateway (anywhere within its radio range) and then reversed course. Also it should be made explicit that tracking in both escapeways of a standard entry system is expected. To honor human life and the intent of the MINER Act, it is recommended in the strongest terms possible that the accuracy expectation in both escapeways be the same as that in the working sections (+/-100 feet). This capability exists and is economically available today.

Comment 12 concerning the statement:

iv. Determining direction of travel at key junctions in escapeways.

This expectation is good but is imprecisely worded. A directional gateway at or very near every path at the intersection is what is intended but there are some who will use the imprecise language to argue that a single non-directional reader at the intersection, together with a non-directional single-reader at points 2000 feet away on all adjoining paths gives a "direction of travel indication". But of course that is not what is intended and such an approach would yield an 8000 foot search zone on a simple X intersection.

b. Electronic tracking systems generally should be installed to prevent interference with blasting circuits and other electrical systems.

3. Permissibility--The tracking system must be approved by MSHA under 30 CFR part 23 and applicable policies.

Comment 13 concerning the statement:

4. Standby Power for Underground Components

a. Stationary components (infrastructure) should be capable of tracking persons underground during evacuation and rescue efforts, even upon loss of mine power. In many circumstances, the capacity to provide a minimum of 24 hours of continuous tracking operation after a power loss generally should be sufficient.

b. An individually-worn/carried tracking device (e.g., a tag) generally should provide a low power warning. To facilitate evacuation and rescue efforts, the individually-worn/carried tracking device generally should provide at least 4 hours of operation in addition to the normal shift duration (12-hour total minimum duration).

The standby power/time for both infrastructure and portable devices should be the same number. One is not useful without the other. The Sago rescue went on for 41 hours and should be a major indication that what is specified here in the PPL is inadequate. It is recommended in the strongest terms possible that 48 hours of continuous operation is needed for both infrastructure and portable devices.

Comment 14 concerning the statement:

5. Capacity--Tracking system components (readers) must be capable of tracking the maximum number of persons, including visitors, expected to be in a coverage area.

It is also important that groups be tracked properly at vehicle speeds up to 15mph when they are traveling together by vehicle.

6. Scanning rate--In order to provide timely and relevant information, the tracking system generally should be capable of updating (refreshing) location data at least every 60 seconds.

7. Surface Considerations

a. The surface component of a tracking system should be located at the communication facility required under 30 CFR 75.1600-1 where a person is always on duty when miners are underground and should include a line-powered interface that can display the location of all miners underground. The person should be trained in the operation of the tracking system.

b. The surface tracking component should be equipped with standby power to ensure continuous operation in the event the line power is interrupted.

c. The tracking system interface should display the last known location of a miner when the tracking device is not communicating with the system.

d. Each miner should be uniquely identified.

e. Location data should be associated with a time stamp.

f. Location data should be stored for two weeks so that it will be available for evacuation and rescue of persons underground, as well as for accident investigations.

Comment 15 concerning the statement:

8. Survivability

a. If system components must be installed in areas vulnerable to damage (such as in front of seals), protection against forces that could cause damage should be provided. For example, protection could be provided by installing enclosures in recessed areas, around corners, or other areas that reduce potential for damage, or routing and protecting cables such that potential for damage is minimized.

b. Data storage should not be impacted by interruption of the data link between underground and surface components.

9. Maintenance

a. The equipment manufacturer generally should provide a maintenance schedule and checklist to the mine operator.

b. The mine operator generally should:

i. Establish and follow a procedure to provide tracking during system or component failures in the event that an accident occurs before the failure can be corrected.

ii. Check the standby power and functionality of the system and the devices worn by the miner on a weekly basis as required by 30 CFR 75.512-2.

iii. Follow the manufacturer's maintenance recommendations.

The very excellent expectations on survivability noted in the "communications" section should be repeated here (r.e. redundancy etc.). The survivability of the tracking component of these systems is just as important as the communications components. Excellent survivability consistent with these guidelines will definitely help save lives.

Background

The MINER Act of 2006 included the following requirement for communications and tracking systems:

Comment 16 concerning the statement:

Not later than 3 years after the date of enactment of the Mine Improvement and New Emergency Response Act of 2006, a [n emergency response] plan shall, to be approved, provide for post accident communication between underground and surface personnel via a wireless two-way medium, and provide for an electronic tracking system permitting surface personnel to determine the location of any persons trapped underground or set forth within the plan the reasons such provisions can not be adopted. Where such plan sets forth the reasons such provisions can not be adopted, the plan shall also set forth the operator's alternative means of compliance. Such alternative shall approximate, as closely as possible, the degree of functional utility and safety protection provided by the wireless two-way medium and tracking system referred to in this subpart.

There is no valid reason that the MINER Act provisions can not be adopted for the vast majority of mines.

Since fully wireless communication systems technology is not currently available to mine operators, alternative means of compliance using partially wireless two-way communication is warranted. In addition, the MINER Act requires:

This is untrue and must be redacted.

Consistent with available technology and with the physical constraints, if any, of the mine, the plan shall provide for above ground personnel to determine the current, or immediately pre-accident, location of all underground personnel. Any system so utilized shall be functional, reliable, and calculated to remain serviceable in a post-accident setting.

As of the date of this PPL, electronic tracking is available and MSHA approved. As technological advances are made and become available, MSHA will update this guidance, and District Managers will review existing Emergency Response Plans to consider the manner in which intervening advances in electronic tracking systems may enhance miners' ability to evacuate or otherwise survive in an emergency.

Authority

Section 316 of the Federal Mine Safety and Health Act of 1977, as amended, 30 U.S.C. 876; 30 CFR part 23 and 75.1600.