Introduction Letter

Siemens is pleased to offer the Mine Safety and Health Administration MSHA, Department of Labor, a wireless communication solution that is ideal for day-to-day operations and to assist miners in the event of an emergency. We base our recommendation on the widely-deployed, mature GSM communication technology. There are over 1.7 billion world-wide mobile subscribers who depend on GSM technology for their voice and data mobile communications. The mining industry benefits from enjoy global research and development and economies of large-scale manufacturing that harbor a compelling market base.

We propose that you deploy a full-fledged wireless communication system for your underground communications application. It excels in critical areas that address the unique communication demands of the mining industry. We simultaneously empower you to improve day-to-day operating productivity and, during emergencies, enhance life-saving rescue efforts. These basic requirements include:

Coverage:

- Siemens's GSM technology, designed for macro-cellular networks, enables our radio base station to reach out in the thousand feet range, based on our recent propagation measurements in an Alabama mine. We determined our equipment provides clear communication to all underground areas, as required. We can use minimal equipment and few cables.

Reliability

- Siemens's GSM solution, designed for public cellular communication, is proven to provide carrier-grade network reliability of 99.999% availability. Our solution focuses on reliability and calls for all central modules to be fully-redundant. Periphery modules boast an "n+1" redundancy. Our base station radio equipment has a Mean Time Between Failure (MTBF) that exceeds twenty-seven (27) years. Maximum system uptime translates into uninterrupted communication and full-time quality for each user experience.

Survivability

- Siemens' GSM solution comes with battery backup capabilities in order to meet the stringent requirement of public cellular carriers. Our underground equipment is to be contained in MSHA-certified housing. Siemens' GSM solution provides fully wireless connections between the GSM base stations. The backhaul system is completely wireless, as well. It employs a mesh network concept

that deploys redundant paths from surface to underground, enhancing survivability in case of emergency.

Tracking System

- Siemens' offering will include an RFID based tracking system. By laying out a grid of RFID receivers inside mines, and connecting them over the air back to our GSM base stations, information as to where personnel are located at all times can be transmitted back to a central monitoring center on the surface. The grid lay-out can be planned in advance with the customers to provide the required granularity. RFID tags can be sewn into miner's cloths or attached to equipment required to enter the mine, such as their hard hat. Siemens plans to partner with Archetype to bring their expertise and success in tracking systems.

Siemens relishes the opportunity to respond to MSHA's RFI for improved mining communications. We are confident in our recommendation and in our ability to perform. We seek to earn your trust by applying a GSM solution that enables your industry to improve day-to-day communications and to increase mine safety for your workers. We ask for a near-term meeting to present you more detail of the depth and breadth of our solution.

Part III
Department of Labor
Mine Safety and Health Administration

30 CFR Part 49

Underground Mine Rescue Equipment and Technology; Proposed Rule

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DEPARTMENT OF LABOR
Mine Safety and Health Administration

30 CFR Part 49

RIN 1219-AB44

Underground Mine Rescue Equipment and Technology

AGENCY: Mine Safety and Health Administration (MSHA), Labor.

ACTION: Request for information.

SUMMARY: The Mine Safety and Health Administration is requesting data, comments, and other information on issues relevant to underground mine rescue equipment and technology. Over the last several years, improvements have been made to communication devices, sensors and other forms of technology in general industry. As such, continuous development and deployment of mine rescue equipment and technology are crucial to enhancing the effectiveness of mine rescue operations and improving miners' survivability in the event of a mine emergency. Responses to this request for information will assist the Agency in determining an appropriate course of action as necessary to improve mine rescue capabilities.

DATES: Comments must be submitted on or before March 27, 2006.

ADDRESSES: Comments may be submitted by any of the following methods:

- Federal eRulemaking Portal: http://www.regulations.gov. Follow the instructions for submitting comments.
- E-mail: zzMSHA-Comments@dol.gov. Include the Regulatory Information Number (RIN) for this rulemaking (RIN 1219-AB44) in the subject line of the message.
- Fax: (202) 693-9441. Include RIN 1219-AB44 in the subject line of the fax.
- Mail/Hand Delivery/Courier: MSHA, Office of Standards, Regulations, and Variances, 1100 Wilson Blvd., Room 2313, Arlington, Virginia 22209-3939. If hand-delivered in person or by courier, please stop by the 21st floor first to check in with the receptionist before continuing on to the 23rd floor.

- Instructions: All submissions must reference MSHA and RIN 1219-AB44.

Docket: To access comments electronically, go to http://www.msha.gov and click on ``Comments'' under ``Rules and Regulations.''

All comments received will be posted without change at this Web address, including any personal information provided. Paper copies of the comments may also be reviewed at the Office of Standards, Regulations, and Variances, 1100 Wilson Blvd., Room 2350, Arlington, Virginia.

FOR FURTHER INFORMATION CONTACT: Robert Stone, Office of Standards, Regulations, and Variances, MSHA, 1100 Wilson Boulevard, Room 2350, Arlington, Virginia 22209-3939. Mr. Stone can be reached at Stone.Robert@dol.gov (Internet E-mail), (202) 693-9444 (voice), or (202) 693-9441 (facsimile). The documents also are available on the Internet at http://www.msha.gov/currentcomments.asp. MSHA maintains a listserve on MSHA's Web site that enables subscribers to receive e-mail notification when MSHA publishes rulemaking documents in the Federal Register. To subscribe to the listserve, visit the site at http://www.msha.gov/subscriptions/subscribe.aspx.

SUPPLEMENTARY INFORMATION:

I. Background

When mine accidents occur, effective mine rescue operation can play a crucial role in ensuring the safe withdrawal of affected miners. Specialized rescue equipment and technology are important components of that effort. Section 501(a) of the Federal Mine Safety and Health Act of 1977 directs the Secretary of Labor and the Secretary of Health and Human Services ``as appropriate'' to ``conduct such studies, research, experiments, and demonstrations as may be appropriate--(2) to develop new or improved methods of recovering persons in coal or other mines after an accident; and (3) to develop new or improved means and methods of communication from the surface to the underground area of a coal or other mine.'' In addition, section 502(b) of the Federal Mine Safety and Health Act of 1977 (Mine Act) requires that the Secretary of Labor, to the greatest extent possible, provide technical assistance to mine operators in meeting the requirements of the Mine Act and in further improving the health and safety conditions and practices in the mines. The Mine Act also requires in Section 115(e) that the Secretary publish regulations for the availability of underground mine rescue teams.

We accordingly test, evaluate and approve certain technologies and equipment for use in mines (see, Title 30, Code of Federal Regulations (CFR), Subchapter B). We also promulgated requirements for underground mine rescue teams in part 49, 30 CFR, covering, among other things, team equipment, equipment maintenance, and training.

II. Current Status of Mine Rescue

The Sago Mine accident in West Virginia on January 2, 2006, that claimed the lives of 12 miners, has underscored the vital role that mine rescue operations play in response to

catastrophic mine incidents. An MSHA investigation into the cause or causes of this accident, along with a detailed evaluation of the emergency response, is underway. Therefore, the role that the mine rescue played has yet to be determined and evaluated. We believe, however, that regardless of the outcome of the investigation, the role of equipment and technology in mine rescue efforts merits a separate review so that we can better assure that the best and most practicably available equipment and technology are being deployed--and continuously upgraded--to maximize mine rescue responses and miner survivability in the wake of mine accidents.

III. Key Issues on Which Comment Is Requested

We are requesting comments, data, and other information on topics relevant to underground mine rescue equipment and technology. Public comment is invited in response to the specific questions posed below. Persons may comment on any other relevant aspects, issues, or questions relevant to mine rescue equipment or technology.

Commenters are encouraged to include any related cost and benefit (e.g., lives saved) data with their submission to this request for information. Any specific issues related to the impact on small or remote mines should also be identified.

When answering the questions below, please key your responses to the specific topic and number of the question, and explain the specific reasons supporting your views. Please identify and provide relevant information on which you rely, including, but not limited to, episodes of past experience, as well as data, studies and articles, and standard professional practices.

A. Rapid Deploy Systems

Rapid Deploy Systems are systems which are easily transportable for use in mine emergencies and which can be quickly set up to provide emergency service. An example would be a seismic sensing system for detecting movement underground, or an electromagnetic sensing system to detect signals transmitted by trapped miners. These systems may employ advanced technology and may be under development.

- 1. What kinds of rapidly deployable systems could be used to locate miners who are trapped by a mine emergency?
- 2. How would such a system work?
- 3. Is the system currently available? If not, what obstacles are there to the development and implementation of this type of system? How long would it take to develop the system?

B. Breathing Apparatus

A mine rescue breathing apparatus is a device which provides oxygen for a mine rescue team member to use in contaminated mine atmospheres.

- 1. U.S. mine rescue teams use devices by Draeger and Biomarine. What other types of breathing apparatuses are currently in use by foreign mine rescue teams?
- 2. Are these other types of breathing apparatuses the best available for quick response in mine emergencies?
- 3. Do these apparatuses incorporate the best available technology? Can they be readily obtained? Do they meet U.S. approval and certification standards?
- 4. How can they be improved? How long would it take and at what cost?

C. Self-Contained Self-Rescuers (SCSR)

SCSRs are devices that provide miners with an MSHA required one hour of useable oxygen to be used for a mine emergency escape. Currently, SCSRs rely on two different technologies. One type uses a chemical reaction to generate oxygen. The other type uses compressed oxygen.

- 1. Is there more effective technology to protect miners than the SCSRs currently available? If so, please describe.
- 2. Should an SCSR be developed that provides more than one hour duration of oxygen? What duration is feasible considering that miners must carry the SCSR? Would it be desirable to require smaller and lighter SCSRs with less oxygen capacity to be worn on miner's belts while at the same time requiring longer duration SCSRs to be stored in caches?
- 3. MSHA standards require each mine operator to make available an approved SCSR device or devices to each miner. Should mines be required to maintain underground caches of SCSRs for miners to use during an emergency, or should each miner have access to more than one SCSR?
- 4. SCSRs are currently required to be inspected at designated intervals pursuant to 30 CFR 75.1714-3. Should SCSRs be inspected more frequently than the current requirements?
- 5. SCSR service life is determined by MSHA, NIOSH and the device's manufacturer. The service life can range from ten to fifteen years depending on the type of SCSR. Should the service life of SCSRs be reduced to five years or a different time limit?

D. Rescue Chambers

A rescue chamber is an emergency shelter to which persons may go in case of a mine emergency for protection against hazards. A rescue chamber could provide, among other things, an adequate supply of air, first aid, and an independent communication system.

- 1. Should rescue chambers be required for coal mines?
- 2. What characteristics should they have? Should they be mobile? Should the rescue chamber be semi-permanent, or built into the mine?
- 3. How long should they support a breathable environment?
- 4. How many people should they support?

- 5. How many rescue chambers should be required--how far apart should they be located?

E. Communications

1. What types of communication systems can be utilized in an emergency to enhance mine rescue?

Response:

Siemens proposes the use of the widely deployed GSM/GPRS wireless communication system (Global System for Mobile communications / General Packet Radio Service).

GSM is an open, digital cellular technology used for transmitting mobile voice and data services. GSM is the technology that underpins most of the world's mobile phone networks. The GSM platform is a hugely successful wireless technology and an unprecedented story of global achievement and cooperation. GPRS (General Packet Radio Service) is the world's most ubiquitous wireless data service, optionally available with almost every GSM network.

Siemens has a proven record building state of the art GSM/ GPRS networks throughout the world. Siemens has enabled operators and small enterprise customers to achieve maximum productivity while ensuring reliability of the network. Apart from the classical terrestrial deployment scenarios, some of the deployments of Siemens' GSM/GPRS system have also been done in challenging environments such as tunnels, underground rail systems, and offshore oil rigs.

Key features for the proposed Siemens communication systems in the mine are:

1. MSHA approved housing for all the communication equipment that will be placed inside the mine, making it intrinsically safe.
2. Underground network elements will have integrated battery backup capability.
3. Redundant board designs for most of the hardware boxes.
4. Wireless connectivity within the hardware nodes. This brings massive advantages for both normal and rescue communication:
    - Redundant connections within the hardware nodes → In case of an explosion if one link fails there is a possibility for the intelligent nodes to automatically route through a different path.
    - Interconnection inside the mine is all wireless → Minimal cabling will be needed as compared to traditional systems.
5. Siemens has performed propagation tests in a mine within the US. Live test results that prove the performance of the standard GSM/GPRS network frequencies can be provided.
6. Siemens offers centralized management and control of all the elements. Miner tracking information, hardware node failure due to emergency etc.

information can be copied to the centralized office and can be easily relayed to the MSHA office.

7. Data services like Internet, Text Messaging etc. can be offered for normal and rescue miners. This can be important for the rescue operators to convey some strategic information quickly to a central location.

Today's Siemens GSM platform is growing and evolving, and already offers an expanded and feature-rich 'family' of voice and multimedia services. The GSM system is not only feature rich but it is also a robust system with authentication and security options for reliable and secured communication in all environments.

2. Current systems include permissible hand-held radios, hand-held radios using small diameter wires, pager systems, sound powered telephones, leaky feeder systems that ``leak'' radio signals out of and into special cables, and inductive coupled radios that use existing mine wires as a carrier for radio signals. Are there other systems?

Response:

Yes, the GSM/GPRS system proposed by Siemens does not require the use of cables to transmit the radio signals. The communication in a GSM/GPRS system occurs from the base transceiver station to the handset through an air interface. Hence the strenuous efforts and expensive installation of long leaky cables throughout the mine are not required. Base transceiver stations housed in a MSHA approved sheltered housing would be located throughout the mine tunnels and inter-connected via a Wireless Backhaul System. The underground system will be connected to the surface “Core” network elements in strategic locations via optic fiber links, to ensure redundancy in case of emergency. These base stations will broadcast digital radio signals in the tunnels, which will allow existing intrinsically safe handsets to make and receive calls as well as send and receive data.

Siemens solution will include an RFID based tracking system (Which Siemens plans to partner with supplier Archetype) that can determine where personnel are located at all times including the time of an explosion. An RFID tag can be sewn into miners clothing or attached to miners' equipment such as hard hats. RFID transceivers can be installed in a grid which granularity can be planned in advance based on customer’s requirements. The RFIDs will send location data over the GSM network to the surface to a central monitoring location (Which Siemens plans to partner for it to be managed by Archetype), and the information can be accessed by secure Internet-based interfaces for viewing the information in text and graphical representation. The benefit of this managed hosting solution is that the mining operation will not have to invest in a significant technology workforce to maintain a data warehousing facility to manage data produced by the system. The RFID system is specifically designed for survivability, so the system can continue to operate in an emergency situation such as explosion. The RFID system utilizes Siemens’

hardware and has been evolved into a highly reliable tracking solution making it ideal for this application.

The RFID system can be leveraged for operational efficiencies such as time and attendance of employees as well as real-time management of equipment (gas emission sensors, machinery, etc.) inside the mines. Siemens and/or Archetype can provide full consulting on enhancing the wireless backbone for additional operating efficiencies upon request.

3. Should a particular system be required over another? If so, which system and why?

Response:

Siemens recommends the GSM/GPRS system as it does not require the use of leaky feeder cables. The GSM/GPRS system offers key benefits such as improved coverage, seamless handovers, advance calling features such as: call waiting, 3 way call, caller id and most importantly applications for location tracking. The GSM/GPRS system also allows for packet data transmission.
Since GSM/GPRS is based on an open standard, there is less dependence on a single supplier, as would be the case for a proprietary solution.
Due to open standards and worldwide deployments, training and experienced engineers are readily and immediately available to plan, install and maintain GSM based systems.

4. What new communication devices or technology may be well suited for day-to-day operations and also assist miners in the event of an emergency?

Response:

The GSM/GPRS system is an excellent choice for enhancing the productivity of mine operators as it provides voice and data communication virtually throughout the entire mine operation. In emergency situations, the GSM/GPRS system can allow rescue personnel to communicate (via voice or data) with a command center for an efficient rescue operation. Since GSM/GPRS systems have been deployed around the world for many years, this ensures a proven and highly reliable communication platform, free from reliability/quality issues that are typically found in emerging communication systems.

The open standards of GSM can allow third parties to develop mining productivity enhancing devices and/or software at very competitive prices with a potentially reduced time-to-market.

5. How should information be securely, reliably, and quickly transmitted during emergencies from remote locations to the mine rescue Command Center, or

from MSHA headquarters to District offices? What technology should be used to quickly and securely transmit information from the mine site to or from MSHA headquarters, to District offices, mining companies, and the media?

Response:

The GSM/GPRS system has been designed to be a secure network. It provides security through authentication, authorization and encryption for the mobile subscribers as well as ciphering for preventing eavesdropping over the air interface. The Siemens network elements have a carrier-grade high reliability. The packet data network functionality could be used to transmit and receive information quickly and securely such as tracking and sensor data. The GSM/GPRS system connects to the Public Switch Telecom Network (PSTN) through a standard trunk interface. The Command Center or MSHA headquarters can be connected to the PSTN and thus calling from and to the mobile handsets is possible.

Siemens plans to partner with Archetype to provide a common interface to the location of the personnel and additional information about a particular emergency situation such as levels of methane, carbon dioxide, and other gas emissions that may cause hazardous situations before and at the time of an explosion. We recommend that this common interface be designed with the cooperation of MSHA in a way that will best assist MSHA's emergency teams at the time of an emergency, and can also be used by MSHA for real-time reporting of which sensor equipment is currently working in each mine and what the current emission levels are at any time. The interface can be used to provide information to the mine rescue Command Center through an intuitive and easy-to-use secure interface, and can also be used to coordinate information from MSHA headquarters to District offices when needed. The system can be used to deliver emergency notices to MSHA officials when needed, as well as the mining operations themselves. The infrastructure implements several levels of security to protect the information sent through the networks for a comprehensive and end-to-end security model.

6. How can the number of relay points be minimized in a rescue situation so that communications do not get garbled or misunderstood?

Response:

State of the art solution that Siemens is offering doesn't have a relay point architecture. Traditional communication equipment has a repeater concept to use the same signal throughout the mine. Siemens can provide a carefully designed network plan for the location of the nodes (base stations) to provide a high level of coverage and quality of communication inside the areas planned as per the requirements of the mines, hence the interdependency on the adjacent nodes (base stations) is minimum. GSM Base stations provide the service coverage inside the mine tunnels. Due to the digital nature of this technology, communication quality will be comparable to most terrestrial cell phone systems. During emergency

situation there are redundancy options in the system to allow users to communicate, even if a certain section of the mine is destroyed in a disaster situation.

7. How can communications be improved when a rescuer is wearing a breathing apparatus and talking through a speaking diaphragm in the mask?

Response:

A mobile station (handset) can provide a speaker phone capability which will improve the quality of the communication. A wireless microphone, using handsfree kit can be worn under the mask. Siemens plans to partner with Archetype to supply a data terminal for use in the system that has already been designed to pass MSHA certification requirements to use in this system. The data terminal is already voice capable, and is being modified to be able to support both voice and data communications per MSHA's approval requirements.

PEDs are one-way communication devices that transmit text messages through the earth to receivers which are carried by miners. PEDs are currently being used in nineteen mines throughout the U.S. Should PEDs be used even though they can only transmit signals to miners and are not bi-directional?

Response:

The GSM/GPRS system offers superior alternative to PEDS. The Text Messaging Service which enables users to send short messages (160 characters) to other users. Delivery acknowledgement is provided. This is a very popular service, with 400 billion SMS messages sent worldwide in 2002. The GSM/GPRS system has bi-directional communication unlike the PED system. PED is also limited to text, whereas GSM/GPRS enables bi-directional text, voice and data communications. The use of GSM/GPRS will allow a single investment for multiple purposes: Daily Communications, Coordination, Tracking, Sensor Telemetry, Data transfer and emergency communication service.

8. Can PEDs be developed into 2-way systems? If so, how long would it take and at what cost?

Response:

PED is not ideal for the needs of the mining industry. Implementing a GSM/GPRS system will solve the unidirectional text usage issue along with the alternative option to use voice communication. Siemens' unique redundancy concept enables 2-way communications with the surface even during emergency situations.

F. Robotics

A robot is a remote controlled device that can obtain and transmit information relative

to the underground environment during mine emergencies. MSHA has pioneered the use of robots in mine emergency operations.

- 1. Besides providing video, gas readings and temperature readings, what other uses can be made of robotics in mine emergencies?
- 2. What could be the role of a robot in mine rescue operations?
- 3. What information could the robot supply to the Command Center?
- 4. What tasks could robots be built and programmed to perform?
- 5. Should individual mines use robots for emergency situations?

G. Thermal Imagers and Infra-Red Imagers

Thermal imagers are devices which provide video pictures of the heat emitted by objects underground. Infra-red imagers provide similar information through the use of the infra-red light spectrum.

- 1. What ``thermal imagers" and ``infra-red imagers" outside of those currently available in the U.S. are in use in other countries, and how can these be deployed in a mine rescue?
- 2. Permissible equipment is equipment which is approved by MSHA to be safely used in gassy atmospheres. Should thermal and infra-red imagers be permissible equipment?
- 3. What are the costs associated with these devices?
- 4. Should all underground mining operations be required to have one of these devices available on-site?

H. Developing New Mine Rescue Equipment

- 1. What are the technological or economic problems in developing new equipment such as mine communications equipment or other mine rescue technology?

Response:

There are existing wireless systems such as GSM which can be effectively used for mine communications. Developing a new system for mines may not make economic sense considering there is existing technology like GSM that can work in above surface and an underground environment like mines.

- 2. Do manufacturers of such equipment have problems with making the equipment permissible for use?

Response:

No. Siemens' proposed equipment is well-proven and widely deployed. The GSM equipment can easily be made permissible with equipment housing changes. Siemens is planning to house all equipment to be installed underground in an explosion proof

housing that is already certified by MSHA. The housing will be custom designed for the Siemens equipment and will be submitted to MSHA for certification.

- 3. What are the specific problems?

Response:

Siemens is not aware of any known problems. Siemens has already performed testing in an underground mine in the United States and has concluded that the GSM equipment will work properly for this particular implementation.

- 4. Should the approval process for such equipment be streamlined or otherwise changed? Do current approval standards allow the flexibility for developing new technology?

Response:

The current approval process can be further streamlined to accommodate existing wireless technologies like GSM for usage in mines. Based upon our current knowledge, the MSHA testing is carried out not only on the equipment, but also on the discreet components of the equipment. This will definitely cause delays in introducing new technologies to be used in mines. Siemens proposes to streamline the MSHA testing for equipment which are already tested and certified for equipment safety by NRTLs for compliance to relevant UL and NEBS (Network Equipment Building Standard) to a limited set of tests only for the entire assembly of equipment and not include tests for discreet components.

- 5. How can equipment manufacturers be encouraged to invest in new technologies for mine rescue equipment?

Response:

Pass new government mandate requirements to clearly define the solution needed to resolve a mining emergency and help secure economic incentives for mine operators to improve or upgrade communication systems. Secure a budget to support for trials and the testing needed (Including partnering with major suppliers like Siemens to provide communication mining solutions).

I. Mine Rescue Teams

Mine rescue teams are specially equipped and trained miners who enter mines during mine emergencies to rescue trapped miners and help recover mines. Teams are equipped with self-contained breathing apparatuses, gas detectors; mine rescue communication systems, and other specialized equipment.

- 1. What equipment should an effective team have?

Response:

An effective mine team using a GSM system should have a small handset with handsfree kit for easier communication. Siemens plans to partner with Archetype who can make this handset available for use in the mines and a company that has already contacted MSHA to begin the steps to getting the handsets approved by MSHA for use in underground mining operations.

- 2. Should the number of required breathing apparatuses per station be changed? How and why?
- 3. Each mine rescue station is required to have twelve permissible cap lamps and a charging rack. Each station is also required to have two gas detectors. Should the number of cap lamps and detectors per station be changed? How and why?
- 4. Where and how should that equipment be maintained?
- 5. MSHA requirements for mine rescue teams are found in 30 CFR part 49. These requirements cover such topics as type of equipment, equipment maintenance, team membership and training. What other equipment, technology, membership requirements and training would facilitate or would better facilitate team preparedness?
- 6. Should each team be familiar with the operation of the transportation equipment maintained at all the mines the team covers?
- 7. Some mine rescue teams are using breathing apparatus which, according to the equipment manufacturer, will soon become obsolete. How can existing mine rescue teams be encouraged to update the equipment and technology they use?
- 8. Should any new technology be used to assist mine rescue teams at mine emergencies?

Response:

The GSM wireless system can be used for daily as well as emergency communications.

J. Government Role

- 1. What equipment and technology should be promoted to improve mine rescue?
- 2. How should a mine's status (small, remote or operating under special circumstances) be taken into account in developing new or different equipment requirements?

Response:

All mines should be treated with the same priority. The GSM system is scalable and can be tuned to the needs of smaller or bigger mines.

- 2. How could our standards and implementation regarding mine equipment and technology be improved?

Response:

The standards and implementation regarding mine equipment can be improved by using technologies that have a clear evolution path under a standards-based approach. The GSM system is a standardized technology with world-wide influence on the evolution of Wireless technology. With a strong technology and standards body for GSM there are greater possibilities of its evolution of communications for mines in future. By investing in a standardized wireless solution such as GSM, the mining operation ensures that their investment will be protected. The primary reason for this is that once a wireless standard is adopted by a mining operation for communications, then equipment and device manufacturers can target building solutions that utilize that standard to gain interoperability in such a mining operation. This would be much more advantageous and cost effective than equipment manufacturers being required to design solutions for several different types of proprietary networks, which may inhibit use in a mine depending on which proprietary solution each mine chose to purchase.

- 3. What training, instruction and procedures should be provided to miners to better enable them to survive an underground emergency?
- 4. What types of emergency supplies (timbering materials, ventilation materials, sealing materials, etc.) should be maintained at each mine site?
- 5. What non-regulatory initiatives should we explore?
- 6. What further steps should we take to improve the capability, availability and effective use of mine rescue equipment and technology?

Dated: January 20, 2006.
David G. Dye,
Acting Assistant Secretary for Mine Safety and Health.
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