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**From:** Matt Ward [matt@varismine.com]  
**Sent:** Wednesday, January 25, 2006 11:59 PM  
**To:** zzMSHA-Standards - Comments to Fed Reg Group  
**Cc:** duane@varismine.com  
**Subject:** RIN 1219-AB44

Dear Sir:

My sincerest condolences to the families of the West Virginia mines.

My name is Matthew Ward and I am the Managing Director of Varis Mine Technology Ltd. in Sudbury, Canada. I am a registered Professional Engineer in the province of Ontario and have been working in the underground communications field since 1995. Varis designs and supplies advanced Leaky Feeder networks as well as RFID tracking for underground personnel and vehicles. [www.varismine.com](http://www.varismine.com)

I would like to provide my comments on RIN 1219-AB44:

1- Varis' Smart Com IS Leaky Feeder system has been recently certified by MSHA. Smart Com enables effective two-way communication and is in use at over 25 mines in the USA. Smart Com has Remote Diagnostics so that mine operators can determine the system's status at any time. Smart Com IS remains powered for 4 hours after mine power removed. Smart Com can carry gas sensor data to surface in addition to voice.

2- We have developed a rapid-deploy system called Xtend that uses regular twisted-pair wiring to enable a rescue team to stay in 2-way radio contact with surface. It is low cost and up to 2 miles of twisted pair can be rolled out. Xtend is in use in at least one US mine however it has not been submitted for MSHA approval.

3- Rather than trying to develop a device that can see through rock etc., it might make more sense to keep track of worker's movements on a real-time basis to co-ordinate the rescue effort. Varis' Smart Tag long-range RFID can read 30 tags moving a 30 mph. There would have to be dozens of RFID readers installed in each mine, and Varis' Smart Tag software to manage and display the data. The RFID tags have been Intrinsically Safe certified by ATEX (Europe) and MSHA approval could be fast-tracked. The readers could be installed in Explosion Proof boxes. It would have to be determined how long the Smart Tag readers need to remain powered after the AC power to the u/g mine has been cut. The readers communicate to the Smart Tag software using fiber optic or Smart Com Leaky Feeder networks.

4- My own investigation into ULF (Ultra Low Frequency) transmission systems indicate that a two-way system is unlikely for most coal mines. This is the real drawback with ULF. You can send the message, but you have no way of knowing if the recipient received, understood or agreed to it. Both ULF and Leaky Feeder systems can be used to signal emergencies. It is true that the Leaky Feeder system can be damaged by fire or lightning. The same can be said of ULF systems as they require the signalling cable to either be installed on surface where it is susceptible to lightning or underground where it is susceptible to fire.

5- A redundant network of intelligent routers and switches over a fiber optic network would be able to withstand a mine fire, explosion or roof failure. This network could be constructed using multiplexers (Siemens OTN, GE JungleMUX) or TCP/IP equipment using redundant switches. Either way, these networks would enable high speed data (gas monitors, email), video and wired and wireless voice. There are four reasons why these systems are not widely deployed in underground mines. One is cost - figure on \$1MM per installation. The second is how to power the network equipment and accessories during mine power failures. The third is the cost and effort to attain MSHA approval for all these devices. Reason four is the effort required to continually expand and maintain these systems. I have only seen one mine (a gold mine) make this kind of investment.

I understand the attraction that a one-way ULF system provides for emergency signalling however I believe that communication should be two-way. When you issue the ULF message you have no way of knowing if the message was received (out of range, system failure, cap lamp battery dead) or if the wearer was able to take action (unconscious). Two-way Leaky Feeder enables safer day-to-day operation and crew co-ordination in addition to emergency communication. Haulage vehicles can continually advise their location and direction. Leaky Feeder networks can carry gas sensor and airflow data to surface. Leaky Feeder is simple to extend and maintain and has been in use for over twenty years.

I am available to continue this discussion at your convenience. You can reach me toll-free at 1-877-658-2747. My extension is 207.

Sincerely  
Matthew Ward, P.Eng.  
Varis Mine Technology Ltd.