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FOR IMMEDIATE RELEASE

Stolar Research Achieves Wireless Communication for Locating Trapped Miners

The entire world watched in hope and amazement as 33 Chilean miners were rescued after many uncertain months trapped underground in the San Jose Mine. On the same day of their rescue, engineers from Stolar Research Corporation (Stolar) and the National Institute for Occupational Safety and Health (NIOSH) were successful in receiving through-the-earth (TTE), wireless communication with underground personnel simulating trapped miners.

Stolar's technical team has a 30-year history in developing radio geophysics technology for the mining industry. In the early 1980s, the Raton, New Mexico company pioneered the development of the Radio Wave Imaging Method for tomographic mapping of coal seams with electromagnetic waves. After the Wilberg Mine disaster in Utah (1984), a mine-wide wireless communication system was developed and installed in 15 western underground mines for use in emergency and operational communication. Although initially useful, Stolar's communication system had not been revisited with a modern engineering effort until early 2010. In only a six-month time period, Stolar has created a low-frequency modem technology which is comprised of surface and underground transceivers which are used to communicate via TTE text messaging. This is similar to existing PED systems but allows two-way communication, is low-power, and is man-portable.

Stolar's recent development work on the communication technology was partially funded by NIOSH and field tested at several hardrock and coal mining sites between August and October 2010. Preliminary testing in the western U.S. has proven that Stolar's TTE technology can provide communication through a variety of rock types, with maximum depth capabilities ranging from 800 to 1,400 feet. The maximum depth at a mine is dependent on overburden rock type, thickness of layering, and the rock's physical and electrical properties. The most recent demonstration of Stolar's TTE technology was performed in southwest Pennsylvania, in the Pittsburgh Coal Seam, and was completed the day of the Chilean rescue. This demonstration achieved two-way text messaging in the deepest part of the mine (nearly 800 feet) with ample signal strength remaining; the maximum range at this site is projected to be nearly 1,100 feet. This demonstration was supervised by technical teams from NIOSH and mine safety groups. After this demonstration, Stolar is continuing research and development to add synthetic voice capability, reduce the size of the antennas and acquire full MSHA approvals.

Current communications systems utilize a leaky-feeder system which involves coupling radio communication onto a hard-wired infrastructure of cables or mesh which are physically distributed around the underground mine site. The radio communication travels along the infrastructure and "leaks" out for reception by other radios. Therefore the "wireless" capability is short lived between the handset and the infrastructure, and is a poor description of the technique. The problem with these systems is that in the event of an explosion or fire, the leaky-feeder infrastructure will likely be destroyed, thereby cutting off all means of communication with the trapped miners. Stolar's system is truly "wireless" and solves this problem by transmitting electromagnetic waves through the earth to locations within the mine to successfully communicate with miners to locate their position for the fastest possible rescue. The underground transceivers can then communicate directly through the earth, back to the surface locations.

To enter the passageways of an underground coal mine where methane gas may be present, the electronics must be certified as permissible by MSHA. The process of certifying electronics to be permissible underground requires a lengthy and expensive, cooperative effort by MSHA and the company's technical team. MSHA and Stolar have already approved most components of the system within the last ten years. This is an important and major task in developing technology for use in underground mines.

Communication with trapped miners has been a topic of great interest for many years. In the Farmington (1968), Wilberg (1984), Jim Walter Resources No. 5 (2001), Quecreek (2002), Sago (2006), Alma (2006), Darby (2006), Crandall Canyon (2007) and the recent Big Branch (2009) mine disasters, each exhibited catastrophic voice communications and tracking failures. Because through-the-earth communications and tracking systems were not available to determine the conditions of the trapped miners, the tragedy was made worse by emotional and heroic attempts by over 100 rescue-team members. Valiant rescue workers were injured and killed in the dangerous effort. The tragic loss would have been better managed if the condition of the trapped miners had been known and rescue efforts guided by reliable information.

In the Wilberg disaster, trapped miners needed only to walk 900 hundred feet to escape from the longwall area. In the Sago disaster, the walkout distance was 1,800 feet. The problem with these disasters is that rescue workers could not communicate with the trapped miners and tell them how to escape through the only passable passage. In each case, the seriousness of the accident would have been significantly reduced if two-way wireless communications were installed in the mines. At Wilberg, the telephone wires burned in two, disrupting two-way communications to the trapped miners at the face. Because one of the miners walked out of the mine without injury, the remaining miners awaited a pager telephone call telling them how to escape. Their bodies were recovered a year later only 900 feet to fresh air, waiting by the telephone for the message that never came.

Dr. Larry Stolarczyk has dedicated his research in radio geophysics, a combination of theoretical physics and subsurface electromagnetic wave transmission theory, to solving safety and health problems for the mining industry including mine safety and environmentally cleaner mining. The amazing coincidence of successfully demonstrating Stolar's communications system to government observers on the very day that the Chilean miners were rescued makes this an especially rewarding time for Stolar and Dr. Stolarczyk, after 30 years of research and development in mining-related technologies.