RE: RIN 1219-AB44 - Rapid Deploy Systems

From a series of ground sensors (geophones) buried in the ground, seismologists from around the world can detect and measure the magnitude of earthquakes. In addition, they can also calculate the estimated surface coordinates and depth (epicenter) of the earthquakes. Similarly, as a result of increasing risks factors associated with deepwater exploration to find the next giant oil/gas field, major petroleum companies are investing more capital and resources to develop innovative technologies to improve their extraction methods from their current existing onshore producing fields. As such, the petroleum industry is currently employing the micro-seismic technology to monitor their enhanced oil recovery efforts. The micro-seismic method can provide subsurface images in 3D the migration of compressed gases (like CO_2) from injection wells, pushing the hydrocarbons towards the production wells. Random micro-seismic events had also been detected in reservoirs which when plotted would display a pattern of complex faulting/fracture system where the injected gases could leak.   Such valuable information could assist the oil companies decide the most optimum placement of future injection and production wells. Sophisticated algorithms and clustered PC supercomputers has made this technology a viable option since oil companies want to increase their extraction of hydrocarbons in order to improve their bottom lines.

This same micro-seismic technology can be adopted and scaled down to address the critical issue of detecting trapped miners underground.   Since the amount of seismic data associated with this application is relatively small with respect to petroleum applications, it is possible that a rapid deployable and portable system can be developed and field tested within a year or two. A small array of multi-component geophones can be randomly planted on the surface or grouted a few feet below the surface at a site above where trapped miners are suspected to be located underground. The trapped miners in turn would strike the roof bolt with their picks/hammers so that the seismic energy they generated is strong enough to be detected by the surface geophones. Advanced algorithms will have special features that could filter out cultural background noise levels, especially vehicle traffic noise during data acquisition. It is possible that the seismograph could fit inside a suitcase and could be operated by a laptop PC; thus, making the entire recording system portable. Moreover, special software programs for onsite processing would be developed so that results could be made available within hours after setup.

The Principle Investigator

Lawrence M. Gochioco, president of LM Gochioco & Associates Inc., has 24 years of highly diverse geophysical experience from having worked for major US oil, coal, and geophysical service companies. From 1985 to 2000, he was a Sr. Research Geophysicist at the R&D Department of CONSOL Energy Inc., who successfully built their entire coal geophysics program used to address their complex upstream and downstream challenges associated with exploration, engineering, and environmental issues. Gochioco is an internationally-renowned geophysicist who has published over 25 technical papers and feature articles in various journals and magazines. In addition, he served as an editor for over 15 years in various capacities within the Society of Exploration Geophysicists and is a member of SME. His specialized training and expertise from the oil and mining industries provide him a unique perspective of knowing how to

properly review and analyze different remote-sensing technologies that could be adopted and employed in the mining industry. In 2005, his firm received an award from MSHA to conduct field demonstration of different geophysical methods to detect mine voids.

For more information about the geotechnical consulting services the company can provide, please check the company website @ www.geonanotechnology.com for more details.