

Horizon Sensing and Radio Imaging Method (RIM™) for Detecting and Imaging Underground Barrier Pillars, Mine Voids, and Water.

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ABSTRACT

Given the inundation of the Quecreek Mine in Pennsylvania, considerable attention is being directed to the question of how new technology can be used to prevent such accidents in the future. Not only is the breach of barrier pillars between old and active works a concern, but given the Martin County flood from the failure of a tailing pond impoundment, underground detection and imaging of geology and structures is a critical need.

This presentation will address two technologies that enable underground detection and imaging to prevent – or act as early warning systems of – pillar and impoundment failures. The first technology, the Radio Imaging Method (RIM™), has been commercially used in the industry since the early 1980s. RIM has been used to survey old mining works to confirm the location of barrier pillars. RIM technology can also be used to detect water seepage beneath dams and tailing pond impoundments. A paper on this subject was presented on September 9th at the annual meeting of the Association of State Dam Safety Officials.

The second technology, Horizon Sensors™ (HS) has become available commercially this year. Mounted on the cutter drum of a continuous miner (CM) the HS can detect the coal seam boundaries of the roof and bottom rocks, shale, clays, etc. The first HS unit in the United States has been in continuous operations on a Joy 12CM at the Monterey Mine #1 in Carlinville, Illinois since February. With minor adjustments, the detection capability of a HS can be re-directed in a forward mode to detect coal thickness ahead of mining. In such a mode, the HS can act as an early warning system for potential breach of a barrier pillar. The detection signal can be used to shut down the CM if a barrier yield thickness is near.

Both Stolar technologies have been developed and enhanced under the DOE-NMA Mine of the Future program. In partnership with DOE-NETL, Stolar has prepared a proposal to demonstrate the use of HS for detecting barrier pillar thickness. Stolar has already demonstrated this capability at its development facility in Raton, NM. The management of Monterey has agreed to accommodate the use of the HS on its Joy CM to facilitate an underground demonstration.

This presentation will address the underlying science of both RIM and HS, and more important, their applications to enable detection and imaging for the purpose of preventing mine and tailing pond floods.