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 the Radio Imaging Method (RIM™), which has been commercial in the industry since the early 1980s. With new innovations in instrumentation and tomography algorithms to increase resolution, 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 key benefit of RIM is that it can be used from the surface to image coal seams and other geology to identify voids such as old works, and it can detect water and/or air gaps. From the surface, RIM transmitters and receivers are lowered down boreholes. Given the range of the signals, RIM can eliminate the need to drill on close centers when trying to locate old works. The reduction of boreholes is a significant cost savings. Also, RIM can be used in-mine, in horizontal holes, and cross well to detect water filled entries and voids, as well as water and anomalies within the coal seam structure.

RIM is a technology offered by Stolar Horizon, Inc., and it has recently been enhanced under the DOE-NMA Mine of the Future program, in which WVU participated as well as leading mining companies such as Consol and Peabody.

The presentation will address at a high level the underlying science of RIM, and more important, its applications to enable detection and imaging of old works and underground water for the purpose of preventing mine and tailing pond floods.