

**Contract No.:** B2532537  
**Technology:** Crosshole Seismic  
**Contractor:** Colorado School of Mines

**Summary of technology:**

The crosshole seismic method uses a pair of boreholes. Hydrophone receivers are lowered down one borehole and a seismic source is lowered down another. With this method, coal seams and voids can be detected by their wave velocity contrast with the surrounding strata. Typically, coal seams and voids are indicated by low velocity zones, while surrounding rock strata, such as sandstone, are indicated by higher velocity zones. Seismic data is collected with the source and receivers in various positions to provide optimum seismic raypath coverage. The seismic source can be created by an air-gun instrument or an electronic vibrating source.

**Stated limitations of technology:**

The presence of high velocity layers above and below the coal seam can provide faster routes of travel for the seismic waves than through the coal seam, thereby masking the low velocity coal seam and voids.

**Field demonstration results:**

<b>Field Demonstration Conditions</b>	<b>Goal of Demonstration</b>	<b>Results of Demonstration</b>
Two boreholes located on a hillside and spaced 35 feet apart. A bulkhead was constructed in the mine tunnel so that both air-filled and water-filled conditions could be tested.	Locate a 11 x 11-foot mine tunnel between the boreholes at an approximate depth of 206 feet (Since conducted from a borehole, the depth is limited only by hole depth and equipment).	The tunnel was detected, but the results (interpreted depth) deviated by 8 feet for the air-filled condition, and by 3 feet for the water-filled condition. See report for more details.