This project involved the use of MEA's borehole radar to assess the presence of solid coal barrier pillars in an abandoned mine. These old works were developed during the 1905-1953 time frame and were about 350 ft deep. A map, which recorded the rooms and pillars, showed the presence of significant coal barriers that were left below the project site.

Upon retreat out of the mine, barrier coal can be second-mined or ("robbed") without being recorded. To assess the presence of the 40 ft and 100 ft wide coal barriers noted on the map, ray paths were run longitudinal to the pillars drawn on the map. To provide contrast, ray paths were also taken across areas with entries. The location of the drilled holes and ray paths with the mine map superimposed are shown in Figure 1.

Void detection is accomplished by measuring the strengths of many signals through various ray paths between pairs of boreholes drilled through a coal seam. The attenuation rate of solid coal for the area can be established and compared with other measured attenuations to determine which ray paths pass through solid coal and which pass through, or near, mine voids. By using this method, the presence of a void in a ray path can be determined.
SIGNAL STRENGTH (dB)

MEA is a recognized expert in mine subsidence engineering. With 32 years of experience, MEA's staff have provided services across the full scope of mine subsidence engineering, including significant work in research, site subsidence studies, mine stability analyses, prediction of subsidence displacement and damage potential, subsidence damage evaluation, repair design, and mine grouting design and monitoring. Being foremost in this field, MEA staff have authored over 100 publications on related topics and have worked on projects in coal fields across the U.S.

MEA has also been hired by coal mining companies and others to provide consulting services on active or new operations for both room-and-pillar and longwall mining. These services are included in those listed above. Because of the amount of coal mining related work MEA has done, it has designed and developed a cross-hole radar to detect mine voids for cases where mining may exist.

As a result of the crosshole radar investigation, the mine map was determined to be valid which was further confirmed by later, unrelated drilling. When questions exist about the accuracy of old mine maps, or where no map exists for the project site, crosshole radar can be used to determine the presence of voids or barrier coal. The use of borehole radar surveys provide a fairly reliable geophysical tool for both shallow to deep mine investigations.

ABOUT MARINO ENGINEERING ASSOCIATES, INC. (MEA)

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Having extensively worked on old coal mines and both low and high extraction active mines, MEA is uniquely qualified and separates itself from other geotechnical and mining engineering companies across the United States. MEA also has expertise in a full scope of services in geotechnical and pavement engineering, as well as construction material testing and monitoring.

Gennaro G. Marino, Ph.D., P.E. is president and principal engineer of Marino Engineering Associates, Inc., and has been a licensed professional engineer since 1984.

NEW OFFICE LOCATION

MEA is pleased to announce the opening of our Southern Illinois branch office in Belleville, Illinois. The Belleville office will be servicing projects in the Southern Illinois and Eastern Missouri regions, including St. Louis, Missouri. Our corporate office will remain in Urbana, Illinois.

ADDITIONAL COPIES

If you know someone who would like to receive a copy of MEA's Engineering Update, please let us know.

FOR MORE INFORMATION

There is a significant amount of additional information available on the above subject. For more information please contact Dr. Marino at the address listed below, or e-mail: gmarino@meacorporation.com.

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