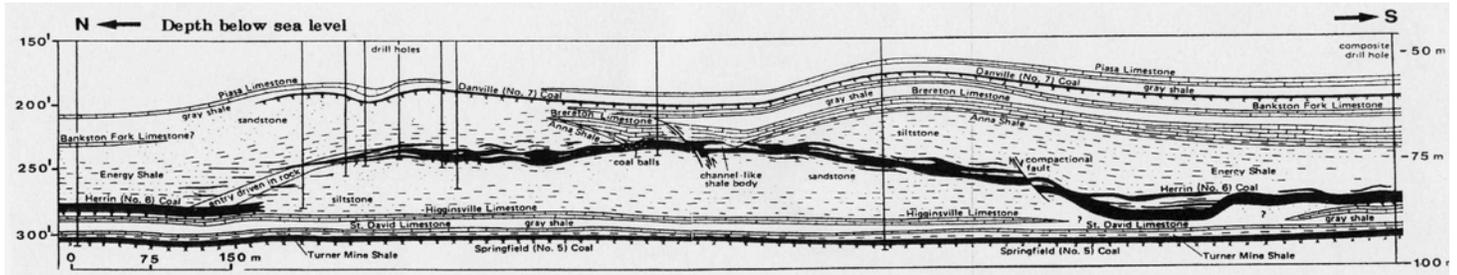


Mine Voids and Tunnel Detection

On July 2002, an underground mining accident occurred at the QueCreek Mine in Pennsylvania, where nine coal miners were trapped underground for nearly 77 hours, before they were all safely rescued. Due to inaccurate or outdated mine maps, the miners unknowingly mined too close to an old flooded mine that resulted in a major water breakthrough. This occurrence raised public awareness to this complex problem, and measures had to be taken to avoid future potential problems.



A year later, MSHA held a symposium on geophysical technologies to detect mine voids in Lexington, KY. It was in this meeting that the coal geophysics program of a major US coal company was disclosed. I was invited to give a talk when they learned that I built and directed CONSOL Energy's entire multi-faceted coal geophysics program from 1985 to 2000. At that time, it was by far the most successful coal geophysics program in the world as leading edge remote sensing technologies were utilized to address the company's complex exploration, engineering, and environmental issues. A full suite of geophysical methods were tried, tested, developed, and fine tuned to detect and map geologic anomalies ahead of mine development, imaging seepage from impoundments, streambed remediation, mine void detection, etc.

A more difficult challenge than detecting mine voids is shown above. Based on exploration drilling, a major geologic anomaly (roll) whose structure is shown above was known to meander inside a reserve area, creating adverse longwall mining conditions. Overburden thickness was ~800 ft and vertical relief of the roll is ~30 ft. A 3D high-resolution seismic survey was conducted to image and map the roll structure to assist mine engineers develop an alternative mine plan. This successful case study was later published in the Geophysics

The founder, Lawrence M. Gochioco, P.G., has over 15 years of diverse near-surface geophysics experience. He has published over 25 technical papers and feature articles in various journals & magazines, and is an editor of his professional society (SEG). The company provides a wide spectrum of near-surface geophysics services and consulting.

journal. Consol Energy's former seismic crew is shown below conducting a seismic field project.



Depending on the target depth of the old mine works, the company can design an appropriate geophysics program that will yield the highest probability of detecting mine voids. This same remote sensing technology can be employed to detect significant geologic anomalies that could adversely impact future mine or longwall production.

The founder of LM Gochioco & Associates Inc. has extensive experience and expertise in this field. In addition, he is an internationally-recognized expert and has published numerous papers and articles.