

## *Using Geographic Information Systems to Map and Model Underground Mines*

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### ABSTRACT

Geographic Information Systems (GIS) provide mine operators and mining regulators with powerful tools to map, model, analyze, and predict surface and subsurface aspects of modern underground coal mines. GIS also enables mining engineers and regulators to effectively combine and study data from many sources and divergent time periods. Current information, extracted directly from surveying and mine modeling applications, can be quickly combined with scanned or vectorized maps of prior operations to show relationships of abandoned mines to proposed or active mining. The modeling and 3D visualization power of GIS helps to identify potential problems and issues before they become critical.

A study of the Leyden underground coal mine, located northwest of Denver, CO, will be presented. The Leyden model shows how paper mine maps, dating back nearly 80 years, can be combined with modern engineering, topographic, and cultural data. Once registered and analyzed, early mining data builds relationships between early mining and present activities, especially relating to safety and concerns of regional growth.