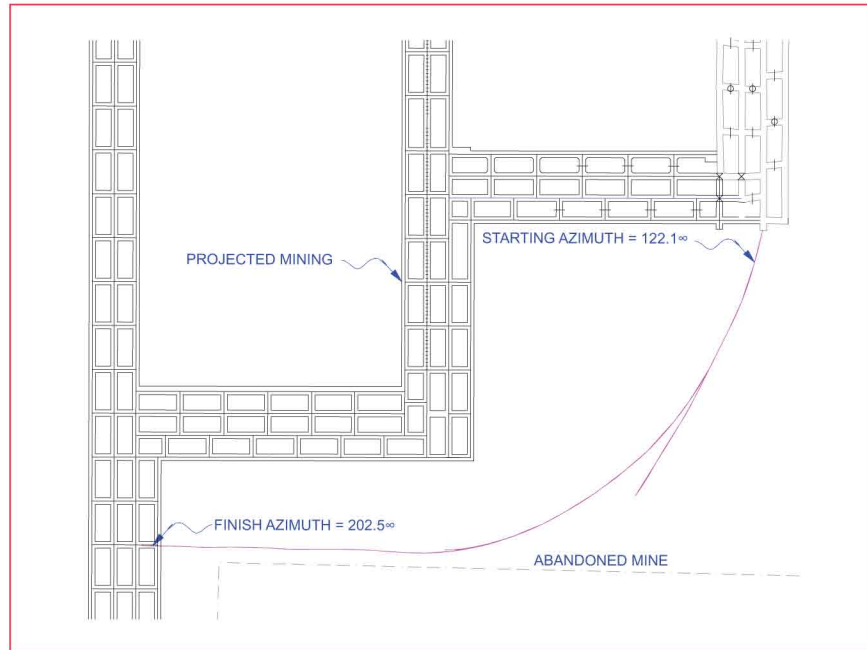


In-Seam Old Works Verification

Old Works Verification or AMV Underground Boreholes

Horizontal, directionally drilled boreholes can be drilled in active mines to define a path of “solid coal” or “coal in-place” (no workings of the abandoned mine) or to probe into the abandoned mine at one or more locations to more accurately define its location and workings. Borehole proves abandoned mine does not encroach upon projected mining. Borehole is a known boundary between abandoned mine and projected mine workings. 80 degrees of horizontal curvature in 1,460 feet. (Total borehole length 2,150 ft.). Roof and floor markers prove the borehole was drilled entirely in coal.



Old Works or Abandoned Mine Verification Boreholes

30 CFR Part 75.388 Regulations regarding test drilling in the vicinity of abandoned mine workings have become increasingly stringent since the QueCreek Mine inundation. Current federal regulations require test drilling anytime the mine is within 500 of an abandoned mine, if certified maps are not available. Directionally drilled horizontal boreholes can verify the presence of, or prove the absence of, abandoned mine workings by establishing that a safe barrier of coal exists between the active mine and the abandoned mine. Intercepting an abandoned mine with the horizontal borehole provides exact location, but does not confirm the orientation or extent of mining. Boreholes passing between the active mine and an abandoned mine proves "coal in place" and serves as a known boundary between the two mines.

- Borehole drilled between abandoned mine to prove "Coal in Place"
- Borehole surveying accuracy proved when continuous miner intercepted the borehole

