# COAL/VOID DETECTION AND SUBSIDENCE CONTROL

Petro-Sonde Survey - Coal and Geotechnical Divisions

**LOCATION.** Pittsburg, Kansas; USA.

**OBJECTIVE Of THE PETRO-SONDE SURVEY.** To determine and evaluate the ability of the Petro-Sonde in defining geologic, hydrologic and mining conditions related to subsidence in abandoned coal mines.

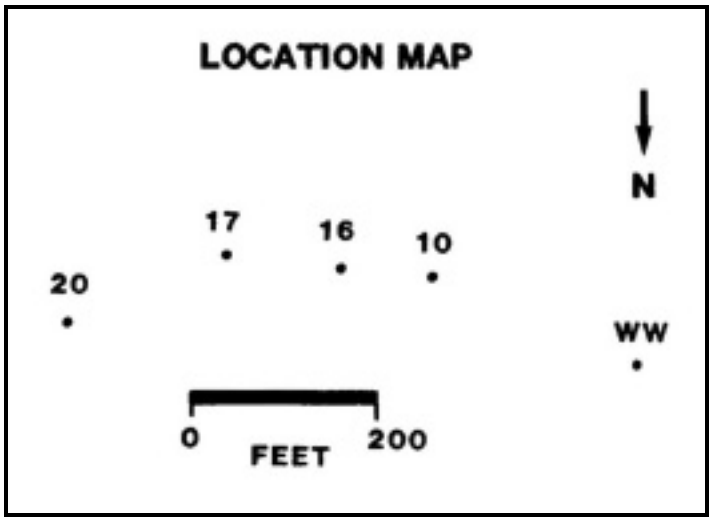
**GEOLOGY.** Coal deposits range 3-6 feet in thickness and 18-31 feet in depth. Voids in coal seams cause subsidence at surface. The coal is overlain by shale, sand, silt and clay. Backfilling was performed at some locations.

**INFORMATION AVAILABLE.** Driller's logs.

**CALIBRATION STATIONS.** Drill holes WW (void calibration), and 17 (coal seam calibration).

**PETRO-SONDE SURVEY STRATEGY**. Calibrate at drill I sites WW and 17 to establish Petro-Log patterns associated with voids and coal seams respectively. Traverse between calibration sites to determine location of voids and coal pillars.

**CONCLUSIONS AND COMMENTS.** The Petro-Log Graphs clearly depicted the presence Of voids, coal seams and pillars, and was able to discern the presence Of waste backfill (Figure 1). Depth accuracy ranged from 2-5 ft, while thickness resolution was consistent with drilling information. No problems were encountered due to the presence Of utilities, flooded voids or surface conditions. The Petro-Sonde is an accurate and cost effective method for defining subsurface conditions necessary for evaluation and control of subsidence.




**PETRO-SONDE CROSS SECTION SHOWING DISTINCTIVE LITHOLOGIC SIGNATURES FOR BACKFILL RUBBLE, COAL, AND VOID IDENTIFICATION.**

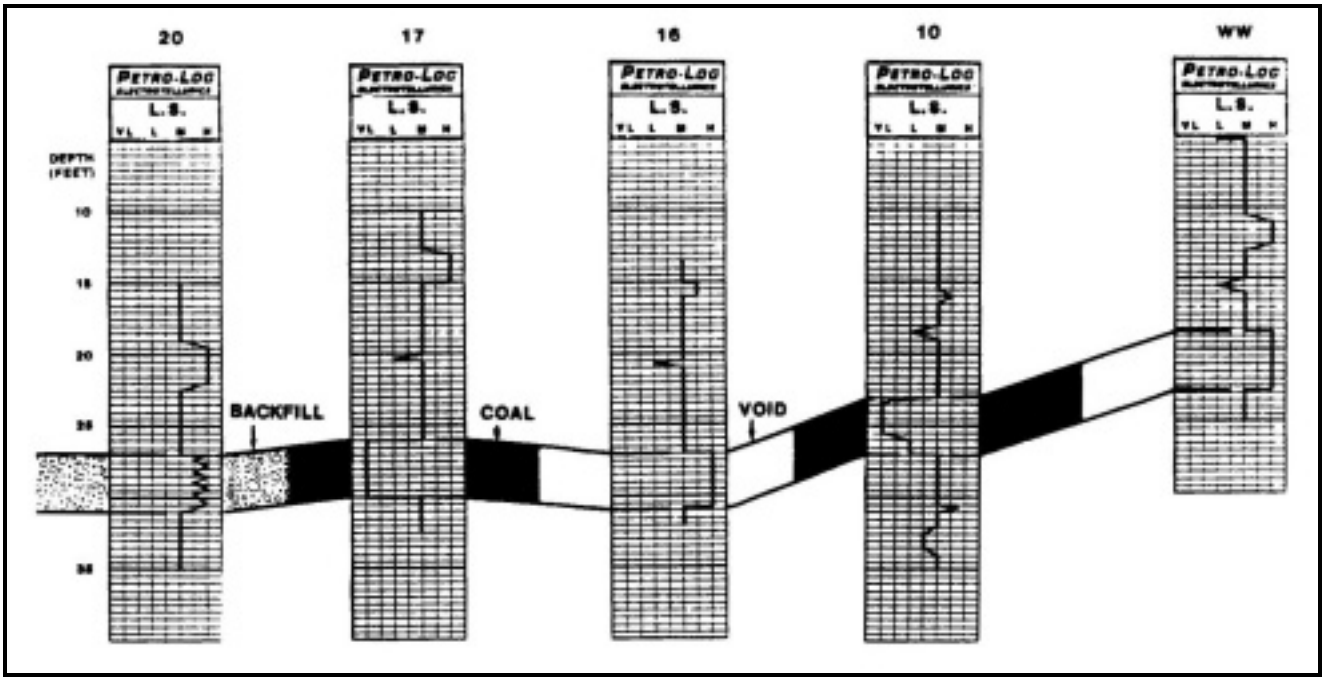



FIGURE 1