

Environmental Applications of a Digital Model of the Upper Carboniferous Pittsburgh Coal Bed, Monongahela Group, Appalachian Basin, USA

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The Upper Carboniferous Pittsburgh coal bed extends over 28500 km² in four states of the Appalachian basin, USA. It was the first Appalachian coal to be digitally assessed by the U.S. Geological Survey as part of the National Coal Resource Assessment, in partnership with state geological surveys in Pennsylvania, West Virginia, Maryland, and Ohio. Originally much larger than present-day extent, the Pittsburgh bed formed as a large peat mire in the northeast; other correlative mires formed in the south and southwest with a no-peat area in the center, making the Pittsburgh the most valuable coal resource of the basin. The coal was first mined in the 1760's from drift mines near Pittsburgh, Pennsylvania. Presently long-wall underground mines produce 71million metric tons annually.

A digital model of the Pittsburgh is composed of Geographic Information Systems files that include coal extent, mined areas, coal elevation, coal thickness, overburden thickness, and coal quality. In the vicinity of Fairmont, West Virginia, numerous inactive underground mines are interconnected to varying degrees and have filled with water, creating a 10900 hectare "mine pool" that requires pumping and water quality treatment prior to discharge into surface waters. In the 1990's, the underground mine pool water levels rose above the regional drainage elevation (Monongahela River), creating the potential for a "blow out" near the coal outcrop, a rapid discharge of acidic, metal-laden waters. The digital data for the Pittsburgh serve as a basis for three-dimensional modeling to help predict potential areas of other future catastrophic mine discharges.