

Geological Society of America, Abstracts with
Programs, vol. 3, no. 7, p. 678

(Annual Meeting 1971, Washington, D.C.)

OCCURRENCE AND MINERALOGY OF COAL BALLS IN THE ILLINOIS BASIN

Rao, C. Prasada and Hermann W. Pfefferkorn, Illinois State
Geological Survey, Urbana, Illinois 61801

Coal balls have been found in 11 coal seams of Pennsylvanian age at 57 localities in the Illinois Basin. Most are lenticular and vary from a few millimeters to a few meters in diameter. They are locally concentrated and are either irregularly distributed vertically throughout the coal seam or restricted to its upper portion. Occasionally they occur as aggregations up to three times as thick as the surrounding coal seam.

X-ray analyses of 54 bulk samples of coal balls show the major minerals are calcite, ferroan dolomite, and pyrite. Eight percent of the carbonate fraction is ferroan dolomite, a lower percentage than is found in coal balls analyzed from Belgium (15%), Iowa (38%), and Germany (100%).

The insoluble residue in 1 N HCl of most of the samples is less than 10% (average 5.5%). Ten samples exceed 10% (average 22%) owing to higher concentrations of pyrite and/or quartz and clay minerals. The average organic content of 20 coal balls is only 2.4%, and X-ray diffractograms of their insoluble residues reveal mostly pyrite, quartz, kaolinite, illite, expandable clay minerals, and some marcasite.

The major minerals in low temperature ash (15% of the coal) of 65 composite samples of Illinois coals are clay minerals (53%), pyrite (23%), quartz (15%), and calcite (9%).

The proportion of minerals in the coal balls differs from that in surrounding coal, suggesting that coal balls were formed in local environments favorable for carbonate formation, where the pH and Eh were significantly different from the surrounding peat.