CARBON-13 NUCLEAR MAGNETIC RESONANCE: A POWERFUL TOOL IN THE ASSESSMENT OF THE STRUCTURE OF SOLID COALS by Ronald J. Pugmire, Kurt W. Zilm, David M. Grant, Wendell H. Wiser, and Ralph E. Wood, Departments of Chemistry and Mining and Fuels Engineering, University of Utah, Salt Lake City, Utah 84112.

A number of western coals of varying rank have been studied in the solid state by means of carbon-13 NMR employing cross-polarization and magic angle spinning techniques. The solids spectra have been compared to the coal derived liquids. By means of artificially broadening the high resolution spectra of the coal derived liquids, a striking similarity in line shape and position is observed, particularly in the case of bituminous coal, when compared to the solid coal. It is noted however, that certain bands visible in the solids are no longer present in the liquid state. The significance of these results are discussed in terms of the carbon skeletal structure and changes therein associated with liquefaction reactions.