

# Maceral/Microlithotype Analysis of the Hardgrove Grindability of Lithotypes from the Phalen Coal Bed, Cape Breton, Nova Scotia<sup>1</sup>

*J. C. Hower<sup>2</sup> and J. H. Calder*

Three lithotypes of Phalen coal from Cape Breton County, Nova Scotia, Canada, were subjected to a modified Hardgrove grindability index (HGI) test. The testing scheme differed from conventional (ASTM D-409) Hardgrove testing by, in one case, repeating the test three times prior to removing the -200-mesh fine coal from the Hardgrove mill, and, in a second test, removing fines after each of three successive Hardgrove tests. Only the first stage of the latter testing scheme actually conforms to the standard HGI test. All processed samples were analyzed petrographically by a combined maceral/microlithotype analysis.

The increase in the percentage of coal ground to -200 mesh increases through the 60- to 180-mesh fractions for

each of the lithotypes for the following two apparent reasons: First, with progressive grinding, more of the oversize material is close to 200 mesh (75  $\mu\text{m}$ ), creating a "pool" of particles ready to be ground to -200 mesh, and, second, the removal of fines from the system at each step eases the grinding at the successive step. The fines retained system shows the influence of buffering of further grinding by the particles retained in the grinding mill. The Phalen lithotypes and the series of Central Appalachian coals, evaluated previously by Hower and Wild (1994), differ in that an increase in vitrite and a decrease in trimacerite is observed in successive -200 mesh fractions in two of the Phalen lithotypes. This is the opposite of the trend observed in the slightly lower-rank Central Appalachian coals.

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<sup>2</sup> Senior petrologist with the University of Kentucky, Center for Applied Energy Research, Lexington, Kentucky