Joint Meeting:

University of Wyoming Department of Geology and Geophysics
Wyoming Geological Association
Geological Survey of Wyoming

April 2-4, 1982
Laramie, Wyoming

Subsurface Practices in Geology and Geophysics
Abstracts of Papers
Compiled by James R. Steidtmann

CRAIG, GERALD N., II, ETHRIDGE, FRANK G., and BURNS, LARRY K., Colorado State Univ., Fort Collins, Colorado, and YOUNGBERG, A. D., Laramie Energy Technology Center, Laramie, Wyoming

Core-Log Correlation and Depositional Environments, Hanna Formation, Hanna Underground Coal Gasification Site, Wyoming

The Laramie Energy Technology Center's (LETC) underground coal gasification (UCG) experiments in the 8 m (26.2 ft) thick Hanna No. 1 coal seam were performed at a site approximately 4 km (2.5 mi) south of the town of Hanna, Wyoming. Overburden at the Hanna UCG site consists of 37m to 152m (120-500 ft) of nonmarine mudstones, sandstones, coals, and conglomerates which constitute a portion

Earth Science Bulletin, 1982

of the Paleocene-Eocene Hanna Formation. Based on data collected from 14 continuous cores and 30 geophysical logs, the overburden above the Hanna No. 1 coal was divided into four local lithologic units, labeled A, B, C, and D from oldest to youngest.

Unit A, which has a fan-shaped geometry, consists of fine-grained sandstones and siltstones with lesser amounts of mudstones. The sandstones and siltstones contain ripple cross stratification of high-angle foresets with slumped and contorted beds. Unit B consists of mudstones with lenticular, trough cross-bedded sandstones and tabular, ripple cross-stratified sandstones. Unit C is a sheet-like body of trough and planar cross-bedded sandstones and conglomerates. Unit D has characteristics of both Units A and B above.

Correlation of geophysical log traces with continuous cores indicates that overburden characteristics (lithology and vertical grain-size trends) of each unit are best represented by gamma ray, density and resistivity logs and to a lesser extent by neutron logs. SP logs are the least reliable indicators of vertical grain-size changes, and more often than not, suggest grain-size trends opposite to those observed in continuous cores. These anomalous trends are due, in large part, to the presence of clay clasts and large amounts of authigenic, pore-fill kaolinite. Positive SP spikes and corresponding high resistivity spikes in some sandstone sequences correlate with tight zones cemented by calcite.

Data from the continuous cores and geophysical logs suggest that Unit A was deposited in a shallow-water lacustrine and lacustrine-delta system, Unit B in a meandering river and floodplain system, and Unit C in a braided river system.