**AAPG Annual Convention**
**Salt Lake City, Utah**
**May 11-14, 2003**

Terry W. Belsher[1], Paul M. Harris[2] (1) ChevronTexaco Exploration and Production Company, Houston, TX
(2) ChevronTexaco E & P Technology Company, San Ramon, CA

**Facies and Fracture Variation in a Deep Shelf Carbonate: Core and Log Comparison**

Two facies, a gray bioturbated skeletal mudstone-wackestone and a dark gray to black laminated mudstone-wackestone were recognized during conventional core description of an Upper Cretaceous deep shelf carbonate. They are interbedded at a variety of scales likely reflecting sea-level variation and periodic widespread anoxia. Both are chalks composed of planktonic foraminifers, molluscs, coccoliths, and calcipheres in a mud matrix. The very thin-bedded nature of these carbonates makes a direct comparison between core facies and gamma ray log response, and therefore fracture-prone facies mapping, tenuous at best.

X-ray diffraction and total organic content (TOC) analysis of core samples from these two facies indicate that only clay and TOC vary significantly. Correlations show that gamma ray response appears to increase with high clay and/or TOC content, corroborating that the core facies variations are not accurately captured with gamma ray logs.

Four facies are defined from clay and TOC content. These ''quantitative'' facies more accurately capture the stratigraphic variation and fracture propensity of the chalk. Fractures occur in both rock types as described in conventional core and in both high and low gamma ray intervals. High clay content in both facies suppresses fractures while high TOC alone does not.

In conclusion, the description of chalk facies and the mapping of these facies using GR data are inadequate to understand the controlling stratigraphic factors of fracture development. Neither routine core description as currently done nor the gamma ray accurately delineates clay rich intervals which appear to suppress fracture development.