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Aureal T. Cross<sup>1</sup>, Kurtis C. Kelley<sup>2</sup> (1) Michigan State University, East Lansing, MI (2) Caterpillar Corporation, Washington, IL

## **Palynology of a Marginal Marine and Terrestrial Prograding Delta System, Upper Cretaceous (Turonian), Central-Western New Mexico**

The lower Upper Cretaceous Atarque and Moreno Hill Formations of the Zuni Basin, western New Mexico, range from marginal marine, above the underlying Mancos Shale, through primarily non-marine sedimentary rocks up to unconformable Tertiary strata above. This coal-bearing terrestrial sequence interdigitates northeastward with tongues of Mancos Shale. The Atarque Formation is a regressive series of coastal barrier bars which prograded northeastward into the Mancos seaway. Palynological samples studied included cuttings from three coal-test wells, type locality roadside and canyon outcrops of the Moreno Hill Formation, and samples from other outcrops. Problems included low palynomorph diversity and poor preservation due to deep weathering of outcrop samples and the presence of Lower Cretaceous palynomorphs in cutting samples due to contamination from drilling mud. Species data were grouped into 16 categories for Cluster Analysis. The groups were a mix of key genera (*e.g.*, *Exesipollenites* and *Phimopollenites*), families (*e.g.*, Gleicheniaceae, Liliaceae), major groups (acritarchs, dinoflagellates, and other gymnosperms), and morphologic forms. Five pollen-spore assemblages were recognized, three of which were particularly important. Assemblage 1 characterizes the Rio Salado Member (offshore marine), with a *Classopollis* dominated gymnosperm assemblage. *Classopollis* increases in abundance offshore, angiosperms are common, and gymnosperms and marine microplankton are less common. Assemblage 2, which is best represented in the Atarque and lowermost Moreno Hill Formations, is dominated by marine microfossils (mainly dinoflagellates) and represents nearshore and brackish-water shales and siltstones. Assemblage 3 is fern dominated (*Cyathidites* typically 30% to 40%), occurring mainly in gray- or carbonaceous shales.