Palynology of the Wilcox Group and its Application in Exploration, Field Development, and Well Operations

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ABSTRACT

In 1996, the BAHA well (AC 600) penetrated Lower Tertiary sediments in the deepwater Gulf of Mexico for the first time. Since then, the deepwater Wilcox play has emerged into one of the world's most prolific exploration targets. Geographic location and complex geology make drilling these ultra-deep prospects a challenging preposition—especially in the current economic environment. A thorough understanding of the geology and stratigraphy helps mitigate some of the risk and has proven to be a crucial tool in successful exploration and development campaigns.

As the internal stratigraphy of Paleocene and Eocene turbidites in the Gulf of Mexico is highly variable, and heavily influenced by salt tectonics and compressional fold belts, biostratigraphy offers an invaluable tool to correlate across complex reservoirs and prospects. However, stratigraphic analysis based on nannoplankton and foraminifera—otherwise the standard fossil groups for biostratigraphy in the Gulf of Mexico—does not provide the desired resolution in the key target intervals of the Wilcox Group. Palynology in contrast is an ideal tool for high-resolution stratigraphy in these sections, as it utilizes both marine fossils (dinoflagellates) and terrestrial influx of pollen grains and spores sourced in the hinterland.

In this talk we will present PetroStrat's proprietary palynology zonation of the Wilcox, and its application from reservoir to regional scale. Derived from analyses of numerous offshore and onshore wells, it enables high-resolution well-to-well correlations, that have proven to be extremely valuable for prospect de-risking, volumetrics, and well spacing decisions. On a regional scale, integration of offshore and onshore data sets offers explorationists insights into sediment provenance and reservoir distribution. Real-time application of palynology at well-site, using proprietary low-risk non-acid processing techniques, is a highly effective tool to identify casing points and total depth (TD) locations.

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