

Reservoir Porosity and Stratigraphy of Eocene-Miocene Successions, North-Central, Jamaica: Onshore Analogues for Petroleum Systems on the Eastern Nicaraguan Rise

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ABSTRACT

Abstract- Petrophysical analysis of Eocene-Miocene carbonates across the North Coast Belt of Jamaica has been supplemented by new detailed geological mapping and petrographic descriptions of samples collected. A revised understanding of the sequence stratigraphy of the White Limestone Group of Jamaica has intensified our interest in identifying onshore analogues for potential hydrocarbon systems offshore southern Jamaica. Focus has been placed on the Eocene-Miocene successions as these carbonate facies exhibit distinct lithological and sedimentary character changes moving from the central Clarendon Block towards the northern coastline of the island. Eight formations within the White Limestone Group have been identified here with multiple facies being recognized including grainstones, packstones, wackestones, mudstones, chalks with chert and coral boundstones. Depositional environments reflect a transition from platform carbonates, shelf edge, open-shelf to lower-shelf. These facies changes reflect an active tectonic history and complex carbonate ramp development across north-south transects. The presence of lepidocyclid assemblages and several milliolid species define an Eocene-Miocene age and a *Eulepidinia undosa* rich assemblage within the grainstones indicates an Oligocene age. Thickly bedded grainstone units across the platform margin provide an excellent reservoir analogue as these facies preserve good inter-granular and intra-granular primary porosities. Petrophysical analysis of grainstones and packstones facies reveal good secondary porosity (~15-35%) with thick marls and coastal limestones providing a tight top seal. With an Eocene source rock identified, a potential candidate for Eocene-Miocene reservoirs are the foraminiferal grainstones that accumulated on the platform margin and later transported into the basin during lowstands and highstands. This work contributes to the ongoing hydrocarbon exploration initiatives in Jamaica and provides an onshore analogue for the Walton Basin offshore southern Jamaica on the Eastern Nicaraguan Rise. Keywords: Eocene-Miocene, hydrocarbon exploration, Jamaica, Nicaraguan Rise, North Coast Belt, reservoir porosity, White Limestone Group