

# **GEOLOGICAL CHARACTERIZATION AND RESERVOIR ANALYSIS OF THE LOWER EAGLE FORD GROUP IN DEWITT COUNTY, EAST TEXAS**

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## **ABSTRACT**

### **Problem Statement and Objectives**

The Lower Eagle Ford (LEF) Group is an important reservoir for unconventional oil and gas, presenting distinct drilling and well-production challenges in the area surrounding the San Marcos Arch and extending into East Texas. A thorough investigation is necessary to fully comprehend the gradation of the deep-water carbonate strata in South Texas into the argillaceous to siliciclastic strata in the Woodbine in East Texas. Through conducting a geologic characterization of the Devon No. 1 Medina core in northeast DeWitt County, insights into these drilling and production problems have been developed. This investigation developed a chemostratigraphic framework of the area, integrated lithofacies with wireline logs across DeWitt County, and developed an interpretation of the depositional history of the LEF Group in East Texas.

### **Data and Methods**

Data was obtained from the Devon No. 1 Median core in northeast DeWitt County, Texas using core, wireline logs, X-ray fluorescence analysis, and X-ray diffraction analysis. Results were integrated to develop a regional lithofacies analysis of the area.

### **Results and Discussion**

Six chemolithofacies were defined within the LEG using elemental proxies and lithofacies characteristics. Chemolithofacies identified are as follows: chemolithofacies 0 consists of diagenetic limestone concretions, chemolithofacies 1 is volcanic ash, chemolithofacies 2 is a siliceous enriched marl, chemolithofacies 3 is an argillaceous enriched marl, chemolithofacies 4 is an organic-rich marl enriched in redox sensitive elements, and chemolithofacies 5 is a clay rich mudstone. The clay rich chemofacies 5 dominates the upper and lower section of the LEF group corresponding to the Maness Shale and clay wedge and represents the drilling hazard identified by operators in DeWitt County. Wireline prediction of chemolithofacies will allow operators to target organic enriched facies while avoiding clay-rich intervals.

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