
The Occurrence and Distribution of Sedimentary Zeolites in the Main Pass Area, Gulf of Mexico Basin

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ABSTRACT

The Main Pass Field, offshore Louisiana, is a large, salt-dome dominated, Miocene sandstone reservoir where sporadic production problems have been encountered. The production problems appear to correlate with the presence of authigenic zeolites within the sandstones.

This study was undertaken to understand the distribution of zeolites and to create a predictive model for their distribution in the Main Pass field. Zeolites were concentrated by density separation from samples obtained from sidewall cores, and examined under a Scanning Electron Microscopy with Energy Dispersive X-ray Spectroscopy. Positive identification of zeolite mineralogy was confirmed by X-ray Diffraction.

The distribution of specific zeolite minerals is dependent upon distance from the salt dome. The sodium-rich zeolite analcime is found from 0-500 feet from the dome, and calcium-rich clinoptilolite is found from 0-2000 feet from the dome. Beyond 2000 feet from the dome unaltered glass shards, and minor amounts of clinoptilolite are observed. The zeolites formed from precursor volcanic glass shards within the reservoir. We postulate that the zeolitization is controlled by the salinity of the formation waters, which is controlled by distance to the salt dome. As the salinity increases, sodium-rich zeolites increase in abundance.

This predictive model of zeolite-mineralization is potentially applicable to other sandstone reservoirs with a volcanic ash component. Overall, recovery can be increased by recognizing specific zeolites and properly treating the wells with appropriate completion fluids to minimize formation damage and the resulting production loss.