

ABSTRACT  
STRATIGRAPHY AND SEDIMENTATION OF THE LOWER AND MIDDLE  
MORROW OF SOUTHEASTERN NEW MEXICO

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INTRODUCTION

Morrowan siliciclastics and carbonates are the basal Pennsylvanian rock units in the subsurface of southeastern New Mexico. Morrowan siliciclastics, particularly those in the lower two-thirds of the unit, are important natural gas reservoirs. The interbedded siliciclastics and carbonates of this unit represent facies that were deposited in various terrestrial to shallow marine environments. The exploration for siliciclastic (namely, sandstone) reservoirs in the Morrow of southeastern New Mexico is made difficult by the lack of predictability of reservoir trends, which is partly a consequence of the uncertainty regarding the depositional origin of these rocks. Multiple reservoirs in a single well present the opportunity for multiple modes of origin. The predictability of reservoir trends would thus be enhanced by understanding reservoir facies environments. The effective exploitation of these gas reservoirs would be aided by a knowledge of the regional trends of authigenic clay minerals present in the sandstones, inasmuch as porosity, permeability, and hydrocarbon deliverability are controlled to a large extent by the types and petrographic settings of these clays.

This paper summarizes the regional stratigraphy and sedimentology of the Morrowan rocks which make up the primary gas producing zones, namely the basal two-thirds of the unit (Lower and Middle Morrow). Facies environments defined in these rocks are based upon detailed sample analyses and regional facies mapping. The depositional history of these rocks is described in order to gain a framework on which the explorationist may build reservoir models. Clay mineralogy of Morrow sandstones is summarized, based upon x-ray diffraction and scanning electron microscopic analyses of representative samples.

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