AAPG Search and Discovery Article #90048 © 2005 AAPG Mid-Continent Section Meeting, September 10-13, 2005, Oklahoma City, Oklahoma

Redefinition of the Tectonic Features in Portions of Nebraska and Adjoining Areas – New Approaches to Exploration.

Marvin P. Carlson, Nebraska Geological Survey; and William H. Sydow, Nebraska Oil and Gas Conservation Commission

Historically the tectonic pattern in Nebraska has been dominated by the Denver Basin in the west, the Chadron-Cambridge Arch and Salina Basin in the central and the Nemaha Uplift and Forest City Basin in the east. Additional well control and new interpretations allow redefinition of these broad features. The proposed delineations have implications for both the patterns of geologic history and the occurrence of petroleum and mineral resources. Recent approaches have allowed a better understanding of the architecture of the Precambrian basement rocks and their process of emplacement. The emphasis on rejuvenation of these basement trends is of great importance in understanding the Phanerozoic structures and stratigraphic patterns. Several northeast-southwest trends (not the non-existent Transcontinental Arch) are basic to the sedimentary and structural history that controls the occurrence of productive Late Paleozoic trends in the Alliance Basin. The major depositional center of the Denver Basin and its marginal structures controlled the sedimentation and tectonics that provided the Cretaceous reservoirs. The Cambridge Arch has been redefined and the North Platte Arch is newly defined. The newly defined Trenton Shelf contains the Pennsylvanian-age reservoirs in southwestern Nebraska and adjacent areas. It is suggested that the broadly defined (and little explored) Salina Basin has subdivisions that have influenced migration of petroleum. Rejuvenation of basement features strongly influenced the Devonian and Ordovician reservoirs in the Forest City Basin. This integration of basement geometry and tectonic rejuvenation creates new structural patterns that should suggest new approaches for exploration programs.