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Association Round Table

AAPG MID-CONTINENT SECTION MEETING

Wichita, Kansas, October 16-18, 1983

Theme: Energy Impact on the Future

Abstracts of Papers

AMORUSO, JOHN J., Independent, Houston, TX

Outlook for Domestic Exploration (AAPG President's Address)

No abstract.

BERG, J. ROBERT, Wichita State Univ., Wichita, KS

A Mid-Continent Basin: A Reappraisal

One of the largest unevaluated basins in the Mid-Continent is the Salina basin in Kansas and its extension into eastern Nebraska. The purpose of this study is to update all older data, reconstruct new maps, and reappraise the potential for further exploration. The last comprehensive publications on the area were in 1948 and 1956.

The Salina basin includes 12,700 mi^2 (33,000 km^2) in north-central Kansas, and approximately 7,000 mi^2 (18,000 km^2) in east-central Nebraska. The basin is delineated by the zero isopach of Mississippian rocks bordering the basin. The Central Kansas uplift borders the basin on the southwest and Nemaha ridge on the east; the southern limit is an ill-defined saddle in the vicinity of T17S. Boundaries of the Nebraska basin are less well defined, but the axis of the basin trends directly north from the Kansas border along the boundary of Ts10 and 11W, to 41°N lat., and then bifurcates to the northwest toward the Siouxiana arch and northeast for an unknown distance.

Conventional structure maps have been constructed on several horizons, and a series of cross sections depicts anomalous structures. Recent gravity, magnetic, and seismic reflection profiling also provide information on basement tectonics which may influence structures in the younger sediments. Basement depth ranges from 600 ft (180 m) on the northeast Nemaha ridge boundary of the basin, to a depth of 4,750 ft (1,450 m) or −3,000 ft (−915 m) below sea-level datum in Jewell County; therefore, there may be an approximate total of 10,000 mi^3 (42,000 km^3 of sediments for future exploration.

BROWN, HAROLD A., TXO Production Corp., Wichita, KS

Adell Field and Vicinity—Sheridan and Decatur Counties, Kansas

The Adell field in northeastern Sheridan County, Kansas, and other smaller fields in the area, produce oil from multiple zones of the Lansing-Kansas City. Porous zones of this age are shoal deposits consisting of rounded carbonate grains, many of which have superficial oolitic coating. Carbonate grain distribution was controlled by water turbulence and relief on the sea floor. The Jennings anticline existed during Lansing-Kansas City deposition and provided the necessary relief on the sea floor for shoals to occur. Differential rates of sea-floor subsidence and cyclic nature of sediment accumulation account for the multiple porous pay zones which are stacked on top of each other.

CALDWELL, CRAIG D., Cities Service Research, Tulsa, OK

Kansas-Type Cyclothems and Porosity Development in Middle Pennsylvanian Marmaton Group, Dirks Field, Logan County, Kansas

Seven depositional units are recognized in the Texaco 2 Dirks core (4,374 to 4,419.5 ft, 1,333 to 1,347 m) from the upper part of the Middle Pennsylvanian (Desmoinesian) Marmaton Group, Dirks field, Logan County, Kansas. These units make up two Kansas-type cyclothems, the Altamont and Lenapah, and record deposition in response to fluctuating sea level and differing terrigenous influx on the broad, epeiric shelf that was the northern extension of the Hugoton embayment. The units correspond to Heckel's basic, Kansas-type cyclothem members, which are (transgressive) middle limestone, (transgressive) core shale, (regressive) upper limestone, and (regressive) outside shale. The Altamont cyclothem lacks the core shale and perhaps the middle limestone, both of which are present in outcrops in eastern Kansas. The overlying Lenapah cyclothem contains all of the basic members of Heckel's Kansas-type cyclothem.

The (transgressive) middle limestone of the Lenapah cyclothem is a relatively thin, locally burrowed, bioclast wackestone containing *Osagia*-coated bioclasts and a relatively diverse marine biota. Overlying this is calcareous, olive-gray to olive-black, fissile core shale containing phosphorite(?) nodules and local brachiopods. Outside (regressive) shales in the Dirks 2 core are greenish to brownish gray. Although generally unfossiliferous, brachiopods and crinoids are present in the upper part of one of the outside shales. Evidence of plant roots is present locally, and nodular, unfossiliferous limestone with calcite-filled desiccation fractures occurs in the outside shale of the Lenapah cyclothem.

Porosity development in the Altamont and Lenapah cyclothems of the Dirks 2 is restricted to the upper limestone members. The upper limestone of the Lenapah cyclothem, the Idenbro limestone member, is a bioclast packstone and grainstone grading upward into cross-stratified, ooid grainstone. This unit contains intergranular and secondary moldic (principally oomoldic) porosity. Portions of this regressive limestone are slightly oil stained, and porosity is poor to locally fair. The upper limestone member of the Altamont cyclothem, the Worland limestone member, is strongly oil stained and is a pay zone in this well and in the study area. This unit consists of bioclast wackestone overlain by chaetetid-coral bafflestone, and above that, dolomite containing angular limestone clasts, irregular-shaped vugs, and sediment-filled fractures. The Worland limestone displays intragranular, secondary moldic, solution-enlarged moldic, vuggy(?), and fracture porosity. Porosity and permeability are fair to good locally and are thought to reflect, for the most part, meteoric diagenesis related to subaerial exposure on a subtle Altamont high on the sea floor. A cross section through the study area shows a slight thinning of strata overlying the Altamont Limestone in wells where Worland porosity is well developed (i.e., Worland pays) relative to wells where the Worland limestone is "tight." This thinning may indicate an Altamont high, the crest of which may have been situated just northeast of the present-day structure.

CHAUDHURI, S., V. BROEDEL, L. NICASTRO, and R. ROBINSON, Kansas State Univ., Manhattan, KS

Strontium Isotopic Variations of Oil-Field Waters: A Clue to Migration History of Oils

Oil-field waters produced from Middle to Lower Pennsylvanian and Mississippian stratigraphic units in several localities in Ness, Hodgeman, Ford, and Clark Counties of Kansas were analyzed for their strontium isotopic compositions to determine the influence of associated rocks on the chemical characters of the fluids. The $^{87}Sr/^{86}Sr$ ratios of these oil waters, ranging between 0.710 and 0.727, are significantly higher than the