VEAL, HARRY K., DCX Resources, Ltd., Denver, CO

Relationship of Roberts Mountains Thrust to Oil and Gas Exploration in Nevada

The Roberts Mountain thrust is the oldest and probably the largest of many eastward-moving regional thrust plates that make up much of the Basin and Range province. The fault can be traced from the state of Washington through central Nevada into California. Movement commenced during Late Devonian-Early Mississippian time (Antler orogeny), probably as a result of plate collision and subduction farther west along the margin of the eastern Klamath geanticlinal arc.

Ordovician to Devonian age, eugeosynclinal, highly organic (2 to 5%), dark-colored shales, siltstones, cherts, and limestones—the "western siliceous facies"—perhaps originally totaling 20,000 ft (6,100 m) are thrust over "eastern-facies" carbonate and clastic shelf deposits. Movement along the thrust continues sporadically into middle Permian, by which time much of the eugeosynclinal rocks were eroded eastward as a flysch. These clastic deposits of Mississippian, Pennsylvanian, and Permian age are deposited along with shallow-marine units in local basins and sags.

Outcrops of thin-bedded, oil-bearing shales (25 gal/ton) and black cherts of the "western siliceous facies" Vinni Formation are present at Roberts Mountain. This unit is a potential source, seal, and possible reservoir rock, averaging several thousand feet in thickness, which "floors" many of the Miocene valley basins west of the leading edge of the thrust. Oil potential is considered to be good although fewer than 15 wells have been drilled in the area. Many had oil shows but none has tested the Vinni or the overlying Cretaceous-Eocene sedimentary units at depth. Free oil has flowed from perforations at approximately 7,200 ft (2,195 m) from possibly Mississippian or Devonian dolomites in the Amoco-Getty 3 Blackburn Unit, (Sec. 8, T27N, R52E, Pine Valley, Eureka County, Nevada). This is the first substantial oil recovery from the Paleozoic rocks in any valley basin other than Railroad Valley in the Nevada portion of the Basin and Range. Oil appears to be of Paleozoic source. In some valleys the overlying Cretaceous and Tertiary units may provide additional source, seal, and reservoir rocks.

East of the thrust trace, in several valley basins, Paleozoic source and reservoir rocks are present and intertongue with the flysch of the Roberts Mountain thrust. In some valleys, these units are also overlain by sedimentary Cretaceous and Tertiary rocks which may also be potential source, reservoir, and seal for any oil accumulations. Noncommerial Tertiary and Paleozoic free oil and gas have been recovered in several test wells drilled in T29N, R55E, Huntington Creek valley basin, Elko County, Nevada.

Local horst and graben structures, combined with Tertiary truncation similar to that found productive at Trap Spring and Eagle Springs fields, are present in valley basins both east and west of the thrust.

VELBEL, DANITA BRANDT, Yale Univ., New Haven, CT

Microfabric Analysis of Fine-Grained Clastic Rocks as an Independent Criterion for Determining Depositional Environment

SEM examination of clay fabric in siltstones as old as Pliocene has proved useful in distinguishing rapidly deposited muds from hemipelagic clays: turbiditic siltstones are characterized by random orientation of clay minerals and hemipelagic units show preferred (parallel) orientation of clay minerals. Random orientation of clay minerals has been recognized in Paleozoic shales, indicating that postdepositional compaction of shales does not always result in parallel alignment of clay minerals. Therefore, the possibility exists that original depositional fabric of clay minerals is retained in rocks of Paleozoic age, and that clay-fabric analysis would provide an independent tool for interpreting the depositional environment of fine-grained clastic rocks.

This study shows that original depositional fabric of clay minerals is preserved in texturally homogeneous, nonbioturbated mudstones as old as Middle Cambrian. Clay fabric may be used in determining whether the mud deposition was rapid or slow (e.g., pelagic). Rapid mud deposition is characterized by a random clay fabric; slow sedimentation is characterized by preferred alignment of clay minerals. Bioturbation and bimodal grain size within a sample (e.g., a clayey siltstone) also are associated with a disordered clay fabric, so this analysis is most confidently used with mudstones that have a homogeneous texture and show no evidence of bioturbation. Therefore, environmental interpretations based on SEM analysis of clay fabric can be used with confidence provided that the caveats of bimodal grain size, bioturbation, and diagenesis are anticipated.

VERROSS, VICTORIA A., Univ. Texas, Austin, TX

Deposition and Preservation of Supratidal and Intertidal Shell Deposits in a Back-Barrier Environment, Wassaw Sound, Georgia

Extensive supratidal and intertidal shell deposits occur along the margins of Wassaw Sound and major tidal rivers of the Georgia coast. Shell material, primarily from oysters, is derived from the sound, salt marsh, tidal channels, and tidal flats. The deposition and accumulation of supratidal and intertidal shell facies depends on five factors: (1) fetch, (2) storm frequency, (3) wind direction, (4) supply of shell material, and (5) shoreline stability.

Shell berms and shell aprons, the major accumulations of shell in the area, are deposited above mean high tide on the sound and river margins by storm tides and waves. Shell berms are elongate ridges, 15 cm to 2 m (6 in. to 6.5 ft) high and 25 cm to 30 m (10 in. to 98 ft) wide, of accumulated oyster and other shell, marsh float, sand, and organic matter occurring in varying proportions. Shell aprons are lobate deposits, 2 to 30 m (6.5 to 98 ft) wide and up to 2 m (6.5 ft) thick, which are comprised of shell material with or without a sand matrix. These supratidal deposits will be preserved if quickly covered by the relatively impermeable tidal flat and marsh muds to depths below the redox potential discontinuity. Intertidal shell pavements, the result of storm and tidal action on oyster reefs, often have a distinct fabric of vertically packed, tightly wedged shells which are stable under all but storm conditions. Pavements and other intertidal shell deposits are widespread on the tidal flats of Wassaw Sound and are the most easily preserved shell facies. Rapid progradation of the upper tidal flat accompanied by vertical accretion of salt-marsh sediments will result in the rapid burial and consequent preservation of shell aprons and intertidal shell facies. Preserved shell deposits occur on and under the salt-marsh surface in the study area, and are interpreted as oyster reefs, shell aprons, and shell pavements based on their shell orientation, shell body geometry, stratigraphic position, and matrix material.

Preserved supratidal shell aprons, intertidal shell pavements, intertidal and subtidal oyster reefs, and subtidal tidal-channel lag deposits can be differentiated in outcrop by the distinctive geometry, fabric, structure, shell condition, and stratigraphic position of each. The presence of preserved shell berms, aprons, and pavements in outcrop is a reliable environmental indicator of a storm-influenced, estuarine or lagoonal coastline, and of the rel-