

ABSTRACT

DEVELOPMENT OF A VERTICAL SALT WELD, LA POPA BASIN,
NUEVO LEON, MEXICO

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The La Popa basin in northeast Mexico contains thick sections of Cretaceous through Tertiary strata disrupted by several salt diapirs and one salt weld. The salt weld is a fault-like structure trending east-southeast 12 km from its western end to a bend, and another 12 km southeast to its tip in the study area.

Shallow marine siliciclastic strata of the Parras Shale (Campanian), Muerto Formation and lower members of the Potrerillos Formation (lower Maastrichtian) thin toward the salt weld, indicating syndepositional topographic expression of a salt wall. The strata are composed mainly of siltstone, shale, sandstone, and uncommon limestone. These units represent deposition at the distal parts of a deltaic system.

Petrography and stratigraphic position of a thin limestone unit suggest that it is a calci-turbidite deposited at the southeast tip of the salt wall.

Muerto Formation sandstones are feldspathic litharenites originating from a recycled orogen or magmatic arc. The composition of the Muerto Formation varies within the basin. Petrographic analysis of samples from throughout the basin shows that the salt wall blocked the dispersal of sediment in the La Popa basin.

Structural features in the study area include three distinct fault sets and a fold set. Faults within the study area trend north-northwest. Post-depositional folds also trend northwest. Sub-parallel trends of the weld trace, folds and faults suggest a kinematic link between shortening and salt evacuation.

A four-phase weld history consisting of diapirism, welding, shortening, and fault displacement due to continued salt flow is inferred. Normal faulting and diapir-flank folding accompanied the rise of an elongate diapir during sediment deposition. The welding phase was nearly synchronous with diapirism. The Hidalgoan orogeny initiated southwest-northeast shortening oblique to the trend of the salt weld. Detachment folds formed adjacent to the weld where salt was more abundant. Right-lateral, transpressional slip occurred along the salt weld, causing increased vertical displacement to the northwest. Transpression along the salt weld forced the evacuation of remnant diapiric salt. Continued salt flow toward the remaining diapirs in the basin caused the formation of two southwest dipping normal faults.