

accumulation of 1,250,000 barrels. The true potential of such reservoirs still lies in the minds of the exploration geologists.

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Basin-and-Range¹ Structure Reflects Paleozoic Tectonics and Sedimentation

Upper Paleozoic tectonism and sedimentation are the key factors which influenced the relation between valleys and ranges in northeastern Elko County, Nevada.

The Mississippian orogeny which formed the Manhattan geanticline, a northeast-southwest welt in central Nevada, was also responsible for the formation of an east-west-trending positive feature in northern Elko County, Nevada. This feature, here named the Northeast Nevada high is probably an eastward extension of the Manhattan geanticline. The presence of the Manhattan geanticline divided the Cordilleran geosyncline into an eugeosyncline on the west and an unstable shelf on the east. Acting as a buffer zone for the compressive forces from the west, the shelf was gently folded into a series of essentially north-south-trending synclines and anticlines. Rapid erosion of the Manhattan geanticline and Northeast Nevada high fed coarse clastics east and south, depositing the Tonka and Diamond Peak formations on the shelf which was surfaced by the folded Mississippian Chainman shale. Maximum clastic deposition occurred in a foredeep parallel with the east side of the geanticline, while minor amounts from the Northeast Nevada high were being channeled southward into the folded geosynclinal shale basin. Contemporaneous with the clastic deposition in the synclinal folds, erosion was attacking the adjacent shale-capped anticlinal folds and many of the anticlines were eroded as deeply as the Ordovician Eureka quartzite and equivalents. Filling of the synclines and erosion of the anticlines continued through most of Morrowan time.

By middle to late Morrowan time, erosion had reduced the anticlines to approximately the same level as the clastic-filled synclines. A veneer of chert and quartz gravels and grits remained as pediment deposits over this nearly penepleaned surface. By early Atokan time, the orogeny was limited to spasmodic unrest, supplying minor amounts of chert and quartzite pebbles into the newly formed limestone depositional basin (Moleen, Tomera, and Ely formations). In middle Des Moines time, the entire Great Basin was gently uplifted permitting erosion and non-deposition until at least middle Missourian time. By Virgil-Wolfcampian time, partial relaxation of positive forces in the Great Basin again permitted the seas to invade most of eastern Nevada and adjacent Utah (upper member of Oquirrh formation, and equivalent carbonate formations).

Leonardian time was characterized by quiescence and the deposition of a fusulinid-bearing carbonate formation over approximately 9,000 square miles of northeastern Nevada and adjacent Utah. This heretofore unnamed limestone sequence, dated lower Leonard to lower Guadalupian, is here named the Peguop formation. The Peguop formation is 1,525 feet thick at its type section in Sec. 3, T. 33 N., R. 65 E., Elko County, Nevada. Composed of purplish gray, irregularly bedded, platy, silty limestones with interbedded fusuline coquinas, the lower contact is placed at the red silt member which overlies the massive Wolfcampian limestones (unnamed formation), and the upper contact placed at the base of an unnamed massive dolomite sequence which is overlain by the Phosphoria formation.

Subsidence continued, depositing the Phosphoria and Gerster formations, until uppermost Guadalupian time when once again the rejuvenated Manhattan geanticline and Northeast Nevada high shed minor amounts of limestone, chert, quartzite pebbles and gravel east and south into the western part of the Phosphoria depositional basin in Nevada.

Episodes of tectonic unrest in northeastern Nevada occurred during Jurassic-Cretaceous (Nevadian) and Cretaceous-Tertiary time (Laramide).

Not until post-middle Miocene was the area once again subjected to major compressive forces of the Cascadian (Basin-and-Range) revolution. The north-south-trending anticlines, eroded of their Mississippian, Devonian, Silurian and in some places Ordovician sediments, together with continued compressive forces from the west, acted, as the jaws of a vise on the thicker Paleozoic sedimentary piles within the synclines. Weaker sediments in the synclines were forced topographically higher than the adjacent anticlines with shearing occurring along the flanks of the anticlines. Thus, in northeastern Nevada, present ranges were born from a thick sedimentary section once protected in the synclines, while valleys were developed from eroded anticlines stripped of their lower and middle Paleozoic section.

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Stratigraphic Analysis of Winterburn and Wabamun Groups in Southern Alberta

The units studied have been assigned to two groups, the Winterburn group and the overlying Wabamun group.

Wabamun group.

Normal Marine episode
Evaporite episode