

NORTH AMERICAN EXPLORATIONISTS

Petroleum Generation & Entrapment Above A Low-Angle Detachment Fault: Blackburn Field, Eureka County, Nevada.

Ted Flanigan

North American Explorationists Dinner Meeting – March 21, 1994
Social Period, 5:30 p.m., Dinner and Meeting, 6:30 p.m.
H.E.S.S. 3121 Buffalo Speedway

Blackburn Field is a structural trap above a Tertiary low-angle extensional fault, designated the Blackburn Detachment Fault (BBDF). The hanging-wall consists of a westward-thickening slice of mid-Paleozoic rock that was detached from the northern end of what is now the Sulphur Springs Range and transported about 3.7 miles (6 km) west. Structurally, the hanging-wall is composed of the gently-dipping western limb and nose of the pre-existing Blackburn Anticline; the steeply-dipping eastern limb now crops out in the Sulphur Springs Range. The Blackburn Anticline is one of a set of north-south folds of probable Mesozoic age.

The BBDF hanging-wall is segmented by at least seven Tertiary high-angle normal faults which trend NNE-SSW and are generally downthrown to the west. One of these faults separates two oil pools in the Blackburn reservoir.

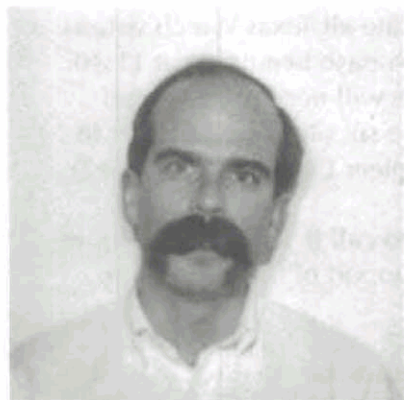
The stratigraphic section consists of valley fill, Oligocene volcanics, lower Mississippian clastics, and middle Devonian dolostone and dolomitic sandstone. The upper Devonian Devil's Gate Limestone and Pilot Shale are both locally absent by erosion or non-deposition. The lower Mississippian rocks are assigned to the Dale Canyon Formation. By mid-Mississippian time the Dale Canyon was overridden by rocks of the Roberts Mountains Allochthon, which remain preserved in axes of Mesozoic synclines in the Sulphur Springs Range and under western Pine Valley, but which were evidently eroded off the Blackburn Anticline prior to Oligocene time.

Blackburn's Devonian and Mississippian reservoirs have produced 2.9 MMBO from five wells through 6/93, with ongoing production of over 1700 BOPD. Most of this oil has come from

the middle Devonian Nevada Group reservoir; very minor amounts have been produced from Oligocene volcanics.

The best well in the field is the Petcon #18 Blackburn, completed in 11/92. This well produced 323 MBO in its first eight months and continues to flow 1400 to 1500 BOPD, water-free. It taps the same reservoir as the #16 and #14 wells some 446' above the original oil-water contact for that pool; the #18 stratigraphy is most comparable to the #16 well. A drillstem test of the #18 recovered a nearly full string of oil with essentially virgin reservoir pressure, reflecting the presence of an underlying water drive. Production casing was cemented and perforated 53' into the reservoir, minor formation damage was effectively treated with acid, and the well was put on production. Calculated initial production was 150 BOPD through a 10/64" choke with flowing tubing pressure of 120 psi.

TED FLANIGAN Biographical Sketch



Ted Flanigan is a geologist for Quest Petroleum in Reno. He has worked for

Quest and others in Nevada for the last six years, and was previously a geologist and reservoir engineer for Mobil Oil. He has a record of successful drilling in Nevada, the Permian Basin, and the Anadarko Basin. He holds degrees in geology and geophysics from the University of Missouri-Columbia and the University of Texas-Austin.