porosity and permeability and oil migrates into them preferentially. The interdune sediments, which have variable and generally poor porosity and permeability, may actually impede the migration of oil. This relationship can be observed in the study area, where outcropping dune sandstones are commonly oil stained, although structurally higher interdune sandstones are free of oil residue.

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Petroleum Geology of the Upper Casper Formation in the Northern Laramie Basin

Stratigraphic position, sedimentary structures, and a lack of fossils or other marine indicators suggest that the Upper Casper Formation (Pennsylvanian and Early Permian) in the Northern Laramie Basin was deposited as a northwest-trending coastal dune field bounded on the northeast by a sea. This depositional system contained two subenvironments: dune and interdune. The dune sediments are large-scale through-cross-stratified sandstones characterized by excellent sorting and moderate carbonate cementation. They are therefore of excellent reservoir quality. The interdune sediments include lenses of less well-sorted horizontally stratified sandstones, which are highly cemented, and lenses of nearly impermeable nonmarine limestones and siltstones.

Field observations of the Upper Casper Formation, where it outcrops at Flat Top Anticline in the Northern Laramie Basin, indicate that the distribution of oil in the Casper Formation is partly dependent upon environment of deposition. The dune sandstones have uniformly high