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Significance of Interdune Deposits in the Upper Casper Formation

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 upper Casper Formation was deposited as an eolian dune field. Because this depositional system included two subenvironments, dune and interdune, the upper Casper Formation is comprised of interbedded rocks of differing reservoir characteristics. The dune sandstones, which are well sorted and not extensively cemented, have uniformly high porosity and permeability; oil migrates into them preferentially. Interdune deposits include lenses of less well sorted and more extensively cemented sandstone as well as lenses of nonmarine limestones and siltstones. The interdune deposits have quite variable and generally poor porosity; they are not good reservoirs and may actually impede the migration of oil. This relationship can be observed in the study area, where outcropping dune sandstones are commonly oil stained and structurally higher interdune sandstones are free of oil residue. Although the interdune deposits of the upper Casper Formation affect the migration

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of oil on a local scale, they are apparently neither thick enough nor laterally extensive enough to provide a stratigraphic-trapping mechanism within the formation.