

PERMIAN TO JURASSIC REDBEDS OF THE WILLISTON BASIN

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ABSTRACT

Redbeds of Permian to Jurassic age are present in outcrops in the Black Hills of South Dakota. Redbeds, which have been referred to as Jurassic in age, are present in outcrops in southern Manitoba. In the subsurface, equivalent strata are the Spearfish Formation of Triassic or Permo-Triassic age in North Dakota and the Lower Watrous or Amaranth Formation of Jura-Triassic or Jurassic age in Saskatchewan and Manitoba. Paleontological data are lacking for age resolution. A careful examination of physical evidence from the subsurface indicates that there are previously unrecognized regional unconformities within the clastic redbeds. Areal distribution patterns of these lithogenetic units favour the Jurassic age assignment for a part of the Lower Watrous and Amaranth Formations.

The Spearfish Formation, as originally defined, includes redbeds which have been correlated with strata from Permian to Jurassic age in eastern Wyoming, although it was originally generally assigned a Triassic age. The Spearfish Formation will retain its greatest utility in the subsurface if it is restricted to strata of Permian to Triassic age. Redefinition of the Belfield and Pine units would avoid the introduction of new names and by applying them to the two lithogenetic units within the Spearfish would more accurately portray the depositional history of these strata. Similarly a redefinition of the Saude, closely resembling the original definition, would preserve the utility of that term. The Saude, which bears an onlap relationship to underlying strata, would then be equivalent to the upper shaly unit of the lower Amaranth of Manitoba.