Laramie Basin

Oil and Gas Geology, Past Production, and Future Development

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Basin geology

The Laramie Basin is a north-south trending basin bounded on the west by the Medicine Bow Mountains and on the east by the Laramie Mountains. The Laramie Basin formed during the Laramide orogeny, from the Late Cretaceous to middle Paleocene. The pre-Laramide sedimentary rocks along the flanks of the basement-cored Medicine Bow Mountains have been complexly folded and faulted. Less deformation is observed on the eastern margin where these same sedimentary rocks are tilted and rest unconformably on the 1,432–1,436 Ma Laramie anorthosite complex (Frost and others, 2013) or the 1,433 Ma Sherman Granite (Frost and others, 1999) further to the south.

Similar to other Laramide basins, oil and gas in the Laramie Basin is commonly found in asymmetric anticlinal traps that occur in the northern half of the basin. One exception is a stratigraphic trap in the Muddy Sandstone of the Big Hollow field (Pritchett, 1985). In 2013, more oil was produced from the Pennsylvanian Tensleep Sandstone than any other formation, totaling 42,074 barrels (WOGCC, 2014). Other oil-producing formations include the Lower Cretaceous Muddy Sandstone and Lakota (Cloverly) Formation. The most-productive natural gas reservoirs include the Shannon Sandstone Member of the Upper Cretaceous Cody Shale in the Dutton Creek field, and the Muddy Sandstone and Lakota (Cloverly) Formation combined reservoirs in the Rock River field.

Casper Formation, southwestern Laramie Basin. Photo by A. Ver Ploeg.

Past production

Hydrocarbon exploration and production has been minimal in the Laramie Basin compared to the other Laramide basins, with the exception of the Hanna Basin. Ten fields in the basin currently produce both oil and gas, and three are abandoned (Toner and others, 2016). The largest field is the Rock River oil field (WOGCC, 2017).

Future Development

Oil production has been on the rise in the Laramie Basin since 2008. The main new play in the basin is the Niobrara Shale, which is also productive in the Denver and Powder River basins. However, "on the rise" may be a relative term for this small basin. It remains to be seen if the Niobrara Shale will prove productive in the Laramie Basin, or if other unconventional plays will become viable as drilling technology continues to improve.

References

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