Fluvial Channel Distribution in the Greater Monument Butte Unit, Green River Formation

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Abstract

The Greater Monument Butte Unit (GMBU) is on the southern edge of the Eocene-aged Uinta lacustrine system. The unit has roughly 1,500 wells that are spaced approximately 20 acres apart over an area of 75,000 acres, which would typically be ideal for high interwell connectivity in a waterflood. However, the majority of this unit lies on a broad and shallow sloping "shelf" of the Uinta Lake before reaching the Duchene Fault Zone (DFZ) which serves as the slope break leading into the deeper portions of the basin to the north. Due to the shallow slope, this region was susceptible to tectonic and climatic changes in lake level causing large transgressive and regressive cycles to be preserved as alternating fluvial/deltaic packages and laterally extensive limestone beds. The fluvial channels are observed typically to have a long major axis relative to their minor axis allowing for more interwell communication along the depositional trend. However, from outcrop and core, these channel systems can still be very complex internally from shale breaks between accretionary packages to the narrow nature of most of the channels causing unexpected pinchouts which creates lateral flow barriers. Previous work has mostly focused on the Castle Peak Interval, notably the hyperpycnites deposited north of the DFZ. This research builds upon this using outcrop exposures in and around 9-mile canyon, along with the high-density distribution of wells south of the DFZ to map individual packages of fluvial/deltaic deposits across the entire productive Green River Formation along a long section of the southern axis of the basin. By isolating the larger channel deposits, the once hidden waterflood responses started to become more apparent allowing for a more systematic approach to waterflood operations.