

Giant Oil and Gas Fields of the Central Utah Hingeline-Overthrust: Reservoired in Mississippian Carbonate Rocks?

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Central Utah's Thrust Belt (CUTB) aligns with the structural and stratigraphic strike of giant, Mississippian reservoir oil and gas fields along the Cordilleran Hingeline in Canada and Wyoming. All the elements for huge CUTB reserves are in place: 1. Wide spread, thick Mississippian and older reservoir quality carbonate rocks. 2. Early-formed Mississippian carbonate cored structures. 3. West-to-east migration of hydrocarbons from Paleozoic source rocks. 4. Timing of hydrocarbon migration. 5. Retained structural integrity.

The key elements to form these giant Cordilleran Hingeline fields are Paleozoic source rocks, west to east hydrocarbon migration and Mississippian reservoir rocks. If traps existed prior to hydrocarbon migration, and structural integrity remains, the results are favorable.

In western Canada, primarily Devonian source rocks have provided in place resources of 40 TCF gas from perhaps 40 major accumulations in the Thrust Belt as well as 1,700 BB oil in stratigraphic traps at the Athabaskan heavy oil resource area up-dip from and east of the thrust belt.

LaBarge Anticline in southwestern Wyoming contains original, in place reserves of 167 TCF gas. These hydrocarbons were sourced from Permian Phosphoria Formation. Both oil and gas initially migrated into this pre-Sevier, early-formed anticline. More recent heat-induced fluid migration altered its content to gas with abundant inerts. Seventeen wells have yielded 5.2 TCF gas from Mississippian carbonate reservoir (21% methane). Average per-well daily production was 45 MMCF of raw gas in 2008. Average cumulative raw gas produced is 307 BCF—2per well.

Mississippian carbonate reservoir rock at Wyoming's Sevier Age Whitney Canyon-Carter Creek Field has produced 2.2 TCF gas and 25 MMB oil (Jurassic Nugget was wet). However, it is sourced by Cretaceous shales that were buried deep enough, post-Sevier tectonics, to generate and migrate sub thrust hydrocarbons. Only southern Absaroka thrust anticlines produce. Along other thrusts there may be 50 barren Sevier anticlines in Wyoming, Idaho and northern Utah.

Central Utah's Thrust Belt Salient is a Sevier age, Mississippian sourced oil-gas producing province. Two fields are now known with Jurassic Navajo Sandstone reservoir rocks after 18 Navajo wildcats since Covenant. Additionally, four criteria demonstrate early, pre-Sevier anticlinal formation prior to Paleozoic hydrocarbon migration from westerly, down-dip Mississippian shales: The Pennsylvanian Emery high, the Jurassic Gunnison Arch, the timing of oil migration into Covenant Field and isopach studies of Jurassic sediments.

So where are the giant Mississippian reservoir hydrocarbon accumulations in the CUTB? They remain undrilled. Not a single test well has penetrated deep enough to encounter Mississippian carbonates since the discovery of Covenant Oil Field in 2004.