

Re-Visiting The Bighorn Dolomite (Ordovician) And Darby (Devonian) Subcrop Geometry Across Southwestern Wyoming: New Light From An Old Well

Donna S. Anderson¹ and Mark W. Longman²

¹Colorado School of Mines, Golden, CO

²QEP Resources, Denver, CO

ABSTRACT

The eastward pinchout of the Upper Ordovician Bighorn Dolomite and Upper Devonian Darby Formation is well known from outcrops in mountain ranges surrounding the Greater Green River Basin (GGRB). Less studied, especially in the last 40 years, is the subsurface distribution of these two units. In addition, published isopach maps of the two formations mostly rely on pre-1972 data when well control was much less than today. A new interpretation of the subsurface pinchout geometry of the Bighorn Dolomite and overlying Darby Formation comes from a well drilled on the crest of the Rock Springs Uplift in 1962. The Mountain Fuel Supply UPRR-11-19-104-4 well is one of only four wells that penetrate all or part of the Devonian-Ordovician succession in the subsurface of the GGRB between the Moxa Arch and the Rawlins Uplift. It was also almost completely cored from above the Mississippian Madison Limestone to PreCambrian basement, and the core is archived at the USGS CRC in Lakewood, CO. From a reinterpretation of the stratigraphy in the core, 25 feet of Bighorn Dolomite is recognized based on the characteristic *Thalassinoides*-bioturbation fabric in crinoidal-peloidal dolo-wackestone typical of Late Ordovician subtidal carbonate facies ranging from Nevada to Greenland. The Bighorn-like lithology is in complete contrast to the alternating dolomitic flat-pebble conglomerate and mudstone of the underlying Cambrian Gallatin Limestone and the brecciated anhydritic, sandy dolo-mudstone to coated-grain grainstone and quartz sandstone of the overlying Darby Fm. This re-interpretation impacts the isopach maps of the two units across the southwestern GGRB. The Darby Fm. isopach and pinchout geometry is slightly modified from past interpretations. The Bighorn Dolomite extent is substantially modified. It is more widespread than previously thought, and the eastward pinchout geometry is more consistent with that exposed in outcrop along the southeastern flank of the Wind River Range.