



ANALOGUE BASINS AND PLAYS

DEEP BASIN

Law (2002) classified the WCSB Deep Basin as a “direct-type” basin-centered gas accumulation, characterized by gas-prone source rocks and low-permeability sandstone reservoirs. In comparing analogous basins around the world, Law identified four reservoir pressures cycles during the development of basin-centred gas systems. The Canadian Deep Basin lies between Phase II, where gas generation has produced overpressured, gas-saturated reservoirs with little free water, and Phase III, where uplift, erosion, and cooling has produced underpressured accumulations. Although some Deep Basin reservoirs, such as the Viking and Belly River, exhibit well-defined downdip overpressured regions and updip underpressured regions, many others (e.g., Cadotte, Spirit River) are completely underpressured, and thus match the Phase III definition most closely.

The best analogues for the WCSB Deep Basin are the Cretaceous basin-centered gas accumulations of the western United States. Source and reservoir rocks were deposited in similar settings, and experienced a similar chronology of burial, maturation, and fluid migration. Law (2002) noted that the San Juan, Raton, and Denver Basins are underpressured, Phase III direct systems, and Popov et al. (2001) provided systematic descriptions of these basins. Individual reservoirs, such as the Muddy Sandstone of the Denver Basin (Higley et al., 2003) compare closely with units such as the Cadotte and Spirit River.

The reader is referred to the extensive reference lists compiled by Law (2002) and Popov et al. (2001) for more detailed information.

FOOTHILLS

Fractured Pardonet/Baldonnel reservoirs of the B.C. Foothills are extensively documented in terms of reservoir quality, fracture development, and exploitation. Most other highly-fractured, low-porosity, high-productivity reservoirs described in the literature, such as the Austin Chalk of the southeastern U.S., occur in much different tectonic settings. However, two examples stand out as good analogues for the Pardonet/Baldonnel and related reservoirs:

- Jurassic Twin Creek Limestone of the Foothills (overthrust belt) of Wyoming and Utah. Bruce (1988) described these widespread, low-porosity shelfal carbonates, deformed by six major tectonic events, most notably thrust faulting. It appears unlikely that sophisticated structural

- models have been developed, as Bruce noted that “predictability of Twin Creek reservoirs is low”.
- Cretaceous Viking conglomerates of the Ricinus Field in west-central Alberta. Halwas et al. (1999, 2001) documented structure, compartmentalization, and fracturing in these low-porosity, brittle chert conglomerates and sandstones, and identified optimal drilling strategies.

NORTHERN PLAINS

As an underpressured basin-centered gas accumulation, the Jean Marie shares many characteristics with Deep Basin reservoirs. Law (2002) noted only one example of a BCGA carbonate reservoir, in the Sichuan Basin of China. Law was likely unaware of the Jean Marie, as it has not been clearly documented in the literature in terms of basin-centered gas.