Abstract

The Cane Creek shale records an early stage of a developing transgressive–regressive cyclic sequence (Cycle 21) in the Middle Pennsylvanian Paradox Formation, southeastern Utah. The Cane Creek is informally divided into three zones, the lower C, middle B, and upper A. The lower C zone typically consists of interbedded silty carbonate and anhydrite. The middle B zone, the primary source and reservoir for oil and gas, consists of interbedded gray to black shale, occasional fine-grained quartz, and silty to sandy carbonate. The upper A zone typically consists of alternating beds of silty carbonate and gray to black shale with laminated or nodular anhydrite. Upper and lower seals, provided by the thick anhydrite and halite, bracket the B zone. Very low permeability in the B zone inhibits oil migration in unfractured rock. Historical data from wells, either logged through or completed in the Cane Creek shale, suggest a good potential source of hydrocarbons. However, many wells completed in the Cane Creek have limited production or experience significant production declines after a few months following completion. The Utah Geological Survey, as part of a three-year, U.S. Department of Energy project, is examining core and cuttings from the Cane Creek shale to maximize its liquid-oil production potential. In particular, we will examine the depositional environment, stratigraphic and lateral extent, frequency and abundance of fracturing, thermal maturity and geochemistry, and geomechanical properties. In this core poster session, we present the Remington 21-1H Cane Creek core, which displays the typical stratigraphic sequences of A, B, and C zones.

Figure 4

Cross section, A – A', from the Big Flat anticline to the Moab anticline. Location of cross section is shown on figures 2 and 3. The interbeds in the Paradox Formation are organic-rich shales, dolomite, and clastics, that are both source and reservoir for oil. The Cane Creek shale is the most prolific producer and is in the basal portion of the Paradox Formation.

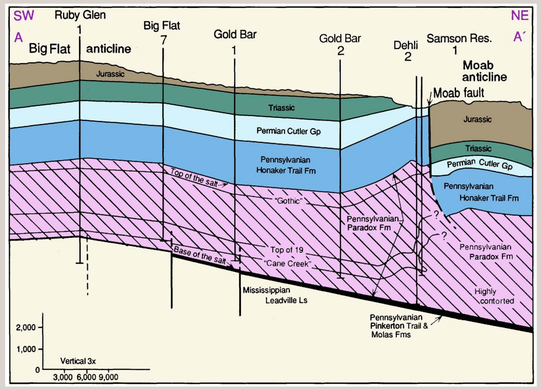

Figure 5

Type log section of the Cane Creek shale of the Paradox Formation from the Big Flat Unit 5 well. The Cane Creek is divided into zones A, B, and C. The B zone is the primary fractured oil reservoir. After Grove and others, 1993.

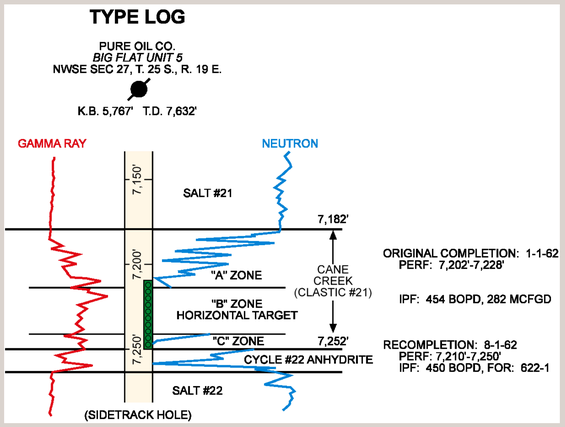

Figure 1

Pennsylvanian stratigraphic chart for the Paradox Basin; informal zones with significant production are highlighted with colors. Red text represents organic-rich shale intervals. Modified from Hite (1960), Hite and Cater (1972), and Reid and Berghorn (1981).

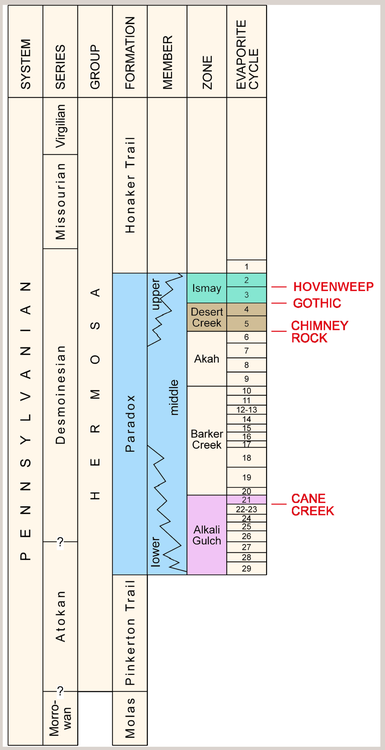

Figure 2

Location map of the Paradox Basin showing the fold and fault belt. Fields shown in solid green are productive areas from the Cane Creek shale of the Pennsylvanian Paradox Formation. Cross section A–A' is displayed in figure 4 and section B–B' is displayed in figure 6.

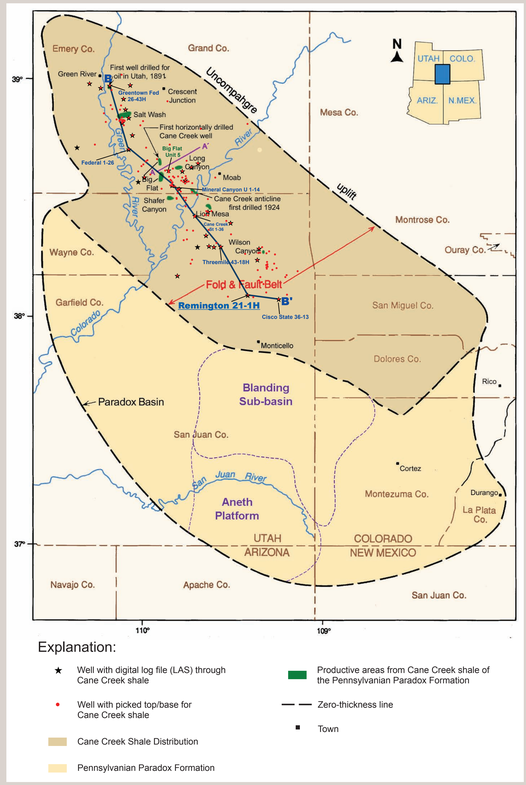

Figure 3

Generalized thickness map of the Cane Creek shale of the Paradox Formation. The shale onlaps to the west and southwest. Thickness of the Cane Creek shale in the area of large salt-cored anticlines is unknown. Local thickness varies due to salt flowages over anticlines and fault blocks. Line A – A' is displayed in figure 4.

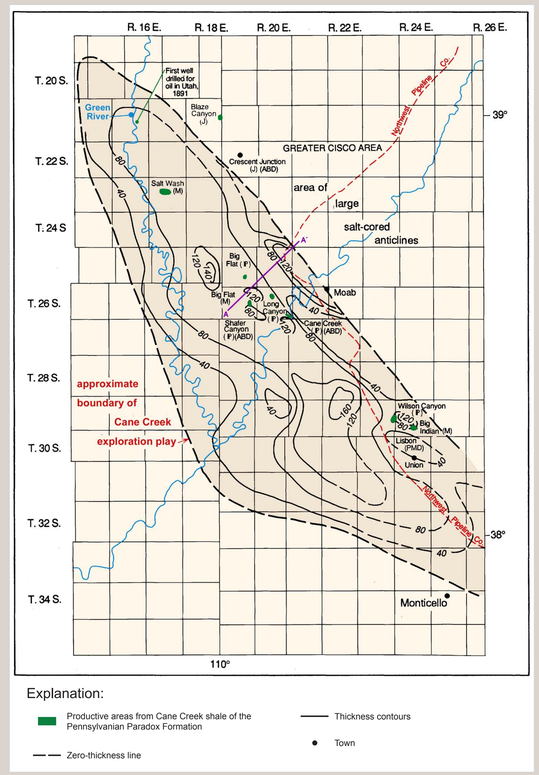

Figure 6

NW to SE cross section B–B'. Location of cross section is shown on figure 2. The Remington 21-1H well is second from right.

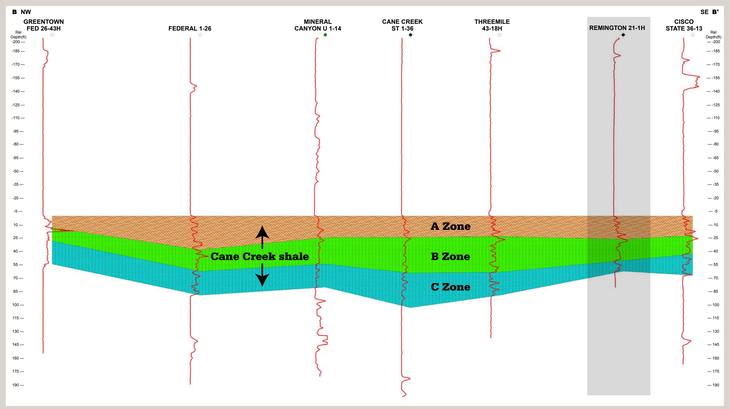

Figure 7

Geochemical analysis from the Remington 21-1H core.