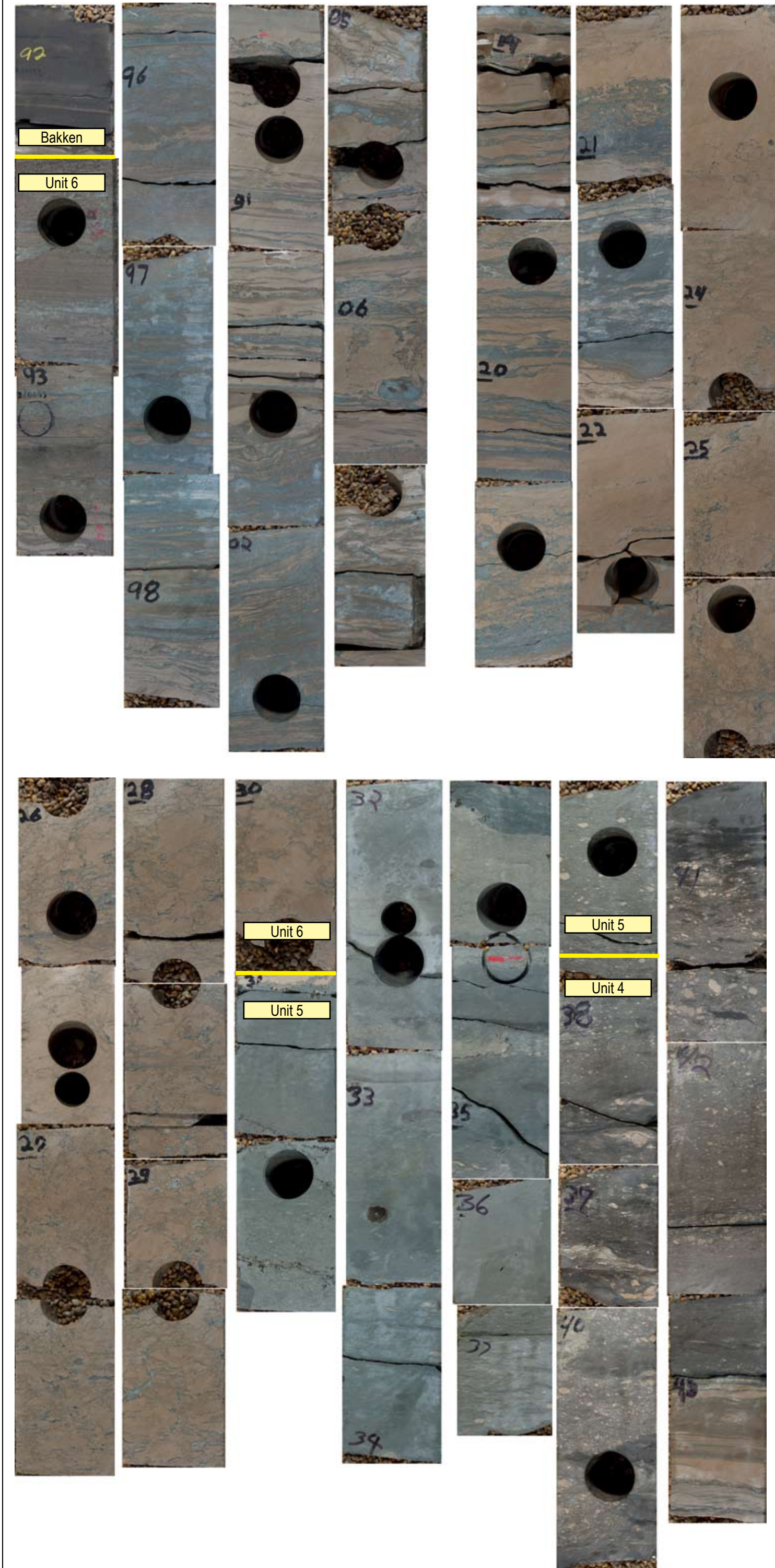
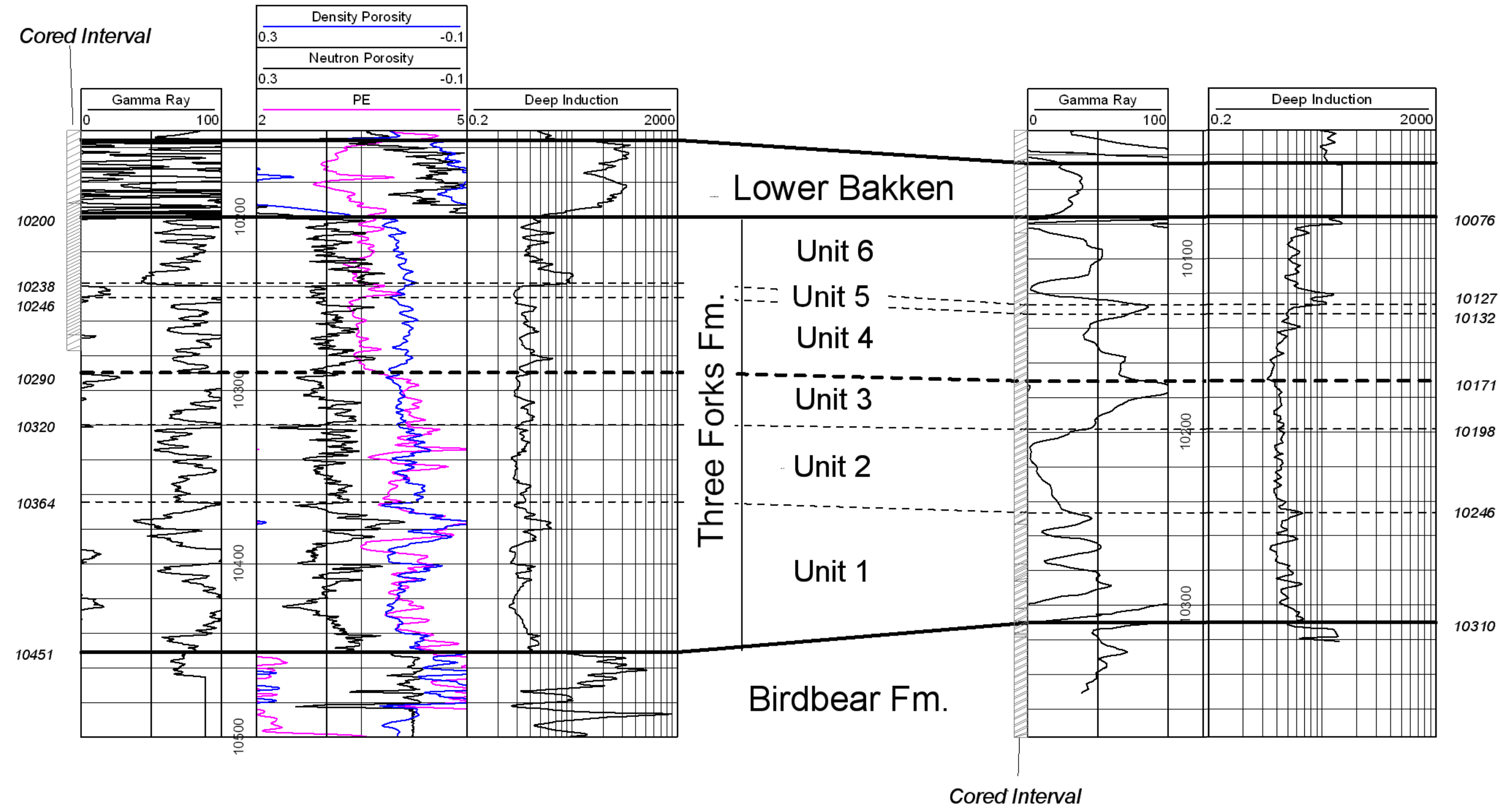


# THREE FORKS FORMATION LOG TO CORE CORRELATION



**DEADWOOD CANYON RANCH 43-28H**  
**FIDELITY EXPLORATION & PRODUCTION CO.**  
 33061005810000  
 T154N R92W S28

**SOLOMON BIRD BEAR F-22-22-1**  
**SOCONY-VACUUM OIL COMPANY, INC.**  
 33025000050000  
 T149N R91W S22



Tentative North Dakota

Period	Group	Formation	Member/Unit	
Mississippian	(none assigned)	Bakken	Upper	
			Middle	
			Lower "Shale" "Silt"	
		Devonian	Three Forks	"Sanish Sand"
				Unit 6
				Unit 5
				Unit 4
				Unit 3
				Unit 2
				Unit 1
Jefferson	Birdbear			

The correlations drawn on this illustration are a working set of tops that are being used by the North Dakota Geological Survey to subdivide the Devonian Three Forks Formation. The subdivisions are based on Christopher's (1961) cross section of core and log based tops that extend from southeastern Saskatchewan to the Solomon Bird Bear F-22-22-1 in Dunn County, North Dakota. The core (on the right hand side) is from the Solomon Bird Bear in which there is core from more or less the entire Bakken and Three Forks section. The core and logs on the left-hand side are from the recently drilled Deadwood Canyon Ranch. In this well only the upper portion of the Three Forks was cored. However, the core is one of the more extensive ones that have been taken from the Three Forks in North Dakota since the introduction of modern neutron, density and photoelectric logs.

The lower portion of the Three Forks Formation in the Solomon Bird Bear consists of massive, faintly bedded to brecciated rocks containing locally abundant anhydrite in the form of nodules and vug filling cement. These features suggest deposition and/or early diagenesis in an arid, restricted marine or sabka environment that allowed for seawater to evaporate enough to precipitate anhydrite and possibly induce dolomitization of pre-existing limestone.

The upper portion of the Three Forks differs in the frequency and detail of primary sedimentary structures. In general, the Three Forks above Unit 3 contains couplets of thin layers of reddish or greenish clay-sized material alternating with thin layers of light tan silt to very fine-sand sized material that sometimes contains ripple cross-laminations. However, intraformation breccias are common and suggest that several episodes of subaerial exposure occurred locally during Three Forks time.

It might be of interest to note that the top of Unit 3 corresponds to a significant drop in PE. This may reflect a change in lithology that is consistent with a decline in the amount of anhydrite in the portion of the Three Forks that overlies Unit 3. The unconformity at the top of Unit 3, evident in the above core photos, is recognized in Saskatchewan (Christopher, 1961), Manitoba (Nicholas, 2006) and North Dakota (Christopher, 1961). The top of Unit 3 therefore appears to be a regional surface that, at least in North Dakota, separates earlier restricted marine sediments containing anhydrite from those deposited under more open or humid shallow marine conditions.

References:  
 Christopher, J. E., (1961) Transitional Devonian-Mississippian Formations of Southern Saskatchewan; Saskatchewan Mineral Resources, Report 66, 103 p.

Nicholas, M. (2006) Petroleum Geology of the Devonian Three Forks Formation, Sinclair Field and Surrounding Area, Southwestern Manitoba; in E. H. Nickel (ed.), Saskatchewan and Northern Plains Oil & Gas Symposium Core Workshop Volume, Saskatchewan Geological Society Special Publication 20, p. 32-49.

Southeastern Saskatchewan (Christopher, 1961)

Period	Group	Formation	Member/Unit	
Mississippian	(none assigned)	Bakken	Upper	
			Middle	
			Lower	
Devonian	Three Forks	Big Valley	Unit 6	
			Unit 5	
		Torquay	Unit 4	
			Unit 3	
			Unit 2	
		Saskatchewan	Birdbear	Unit 1

Manitoba (Nicholas, 2006)

Period	Group	Formation	Member/Unit
Mississippian	(none assigned)	Bakken	Upper
			Middle
			Lower
Devonian	Qu'Appelle	Three Forks	Unit 4
			Unit 3
			Unit 2
			Unit 1
			Saskatchewan

\*Note: core depth is 8 feet high to log depth.

