

NORTH DAKOTA STRATIGRAPHIC COLUMN



TYLER SUMMARY

DRILL STEM TESTS AND PRODUCTION MAPPING

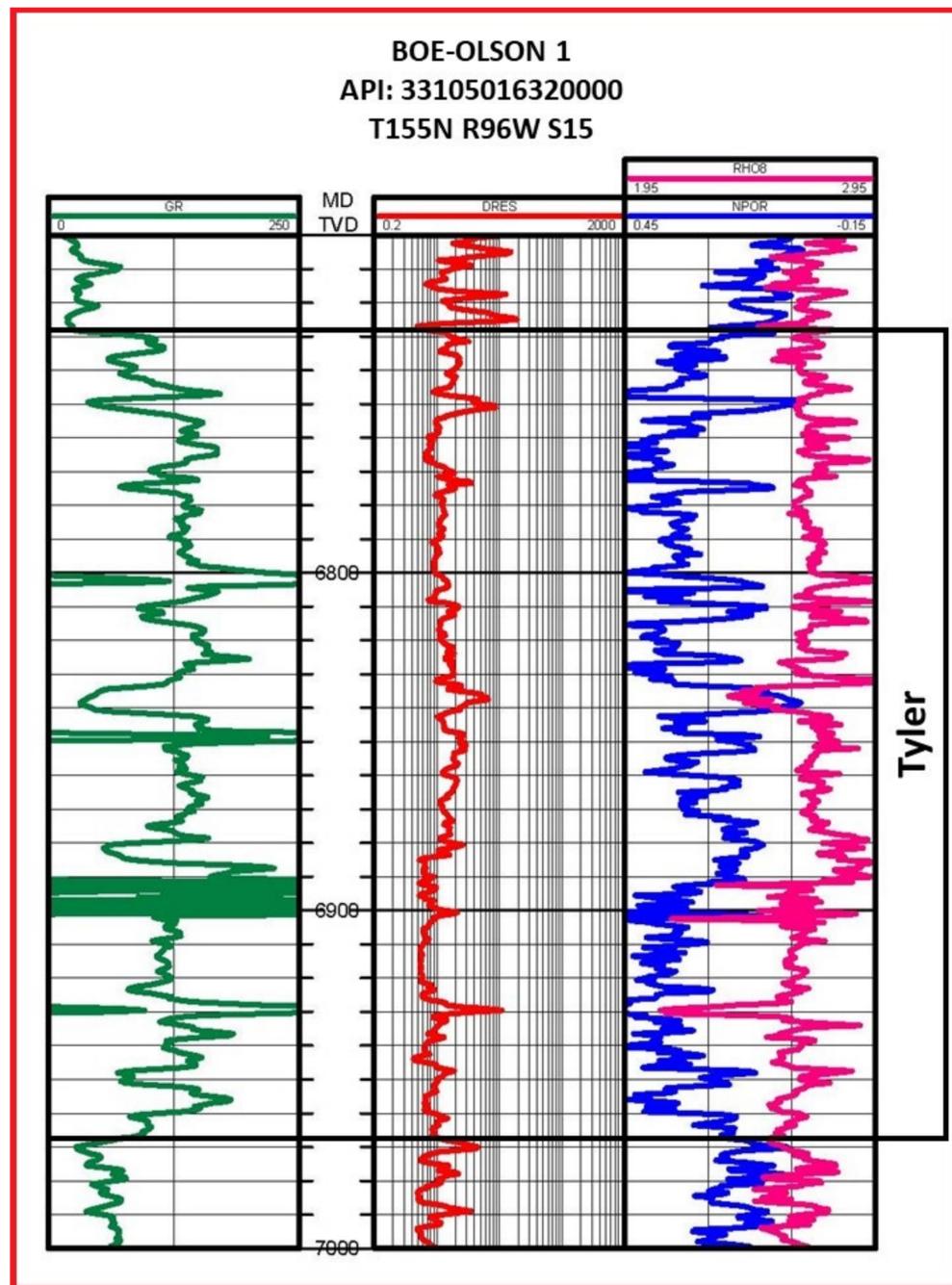
Prepared by
Travis Stollendorf

In order to better facilitate petroleum exploration and development in the Williston Basin, the North Dakota Geological Survey (NDGS) has published a series of production-related maps and corresponding data sets. These maps sets include production and drill stem test (DST) results with an accompanying spreadsheet for easy data extraction. The primary goal of this project is to create a database showing the distribution of hydrocarbons within each productive unit.

Prior to this project, over 55% of the DST results in the state did not have an associated geologic interval. The NDGS utilized a series of filters in Petra and Excel to unite formation tops with DST results. Now over 95% of DST results are associated with a geologic interval. After removing failed (misrun) DSTs, the remaining DST results were then separated into three groups. The first group (Positive DSTa) contains wells that have recovered oil or gas (in either the drill pipe or the sampler), or those that list oil or gas as the primary component of the fluid/gas mixture (e.g. 10' mud cut oil) in the description. Secondly, Positive DSTb wells display results for oil or gas as the secondary component of the fluid/gas mixture (e.g. 50' gas cut mud). Although Positive DSTb wells do show signs of hydrocarbons, the hydrocarbon signal is considered weaker than those in the Positive DSTa group. Lastly, the Negative DST results have no indication of hydrocarbons. Detailed information for each DST (time-pressure data, interval depths, fluid and gas recovery information) can be accessed through the well file database maintained by the North Dakota Industrial Commission (NDIC) Oil and Gas Division.

Production for each well was determined using the NDIC's Production Pools and associated monthly production totals. The production pools utilized are shown on the Production Map for each interval. Cumulative production for each well was calculated through September 2019.

This project is a summary of the Tyler Formation's production and drill stem test results. Map sets include a production map, cumulative production map and DST results in North Dakota's portion of the Williston Basin. The Tyler Formation is highlighted by the red box on the North Dakota Stratigraphic Column on the left. A representative log of the Tyler Formation is shown below along with a map showing the well's approximate location.

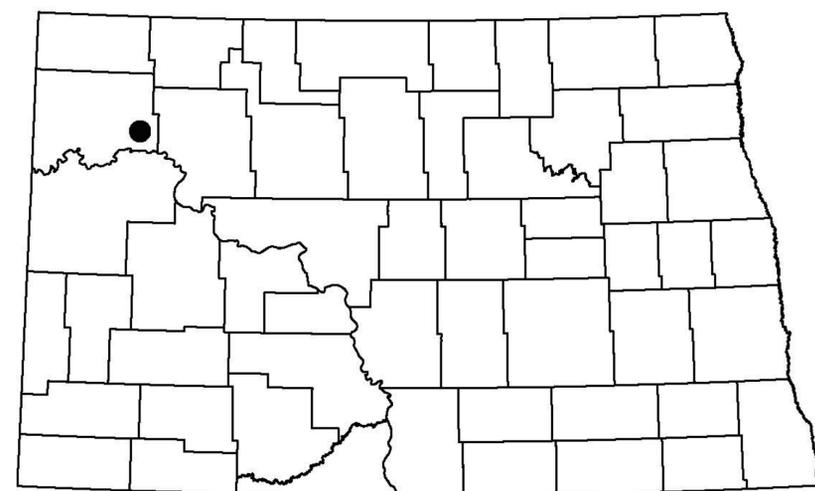


References

Murphy, E.C., Nordeng, S.H., Juenker, B.J., and Hoganson, J.W., 2009, North Dakota Stratigraphic Column, North Dakota Geological Survey, MS-91, 1p.

North Dakota Industrial Commission, Department of Mineral Resources, Oil and Gas Statistics, retrieved October 2019, <https://www.dmr.nd.gov/oilgas/>

NORTH DAKOTA LOCATION MAP



AGE MILLIONS OF YEARS BEFORE PRESENT	ERATHEM		SEQUENCE	ROCK UNIT		
	SYSTEM	SERIES		GROUP	FORMATION	MEMBER
0.01	QUATERNARY	Holocene	TEAS	OAHE	BEVERDALE PICK CITY MAGLE BRIDGE MALLARD ISLAND	
2.6		Pleistocene		COLEHARBOR	WEST CENTRAL EASTERN RED RIVER VALLEY SIBBICK POPULAR RIVER BROWN ARGENTELLE WYDE RED LAKE FALLS ST. BELLAIR BRANDON	
5.3		Pliocene		(Unnamed Unit)		
23.0	NEOGENE	Miocene	TEAS	ARIKAREE		
33.0		Oligocene		WHITE RIVER	SOUTH HEART CHALKY BUTTES	
55.8	TERTIARY	Paleocene	ZUNI	CHADRON	GOLDEN VALLEY	
65.5						BEARDEN
						SENTINEL BUTTE
	CRETACEOUS	Upper	ZUNI	FORT UNION	BULLION CREEK SLOPE CANNONBALL LUDLOW	
						HELL CREEK
						FOX HILLS
						MONTANA
						PIERRE
						NIORARA
						COLORADO
						DAKOTA
						SWIFT
						JURASSIC
201.6	TRIASSIC		ABSAROKA	PIPER	BEVERDALE BELLHEAD TAMPICO KLINE PICARD DUNHAM	
251.0				SPEARFISH	SAUDE	
299.0	PENNSYLVANIAN		ABSAROKA	MINNELUSA	AMSDEN ALASKA BENCH	
318				BIG SNOWY	OTTER KIBBEY	
359	DEVONIAN		KASKASKIA	MADISON	MISSION CANYON LODGEPOLE	
					JEFFERSON	
					MANITOBA	
					ELK POINT	
					WYOMING	
					WYOMING	
					WYOMING	
					WYOMING	
					WYOMING	
					WYOMING	
444	ORDOVICIAN		SAUR	WYOMING	WYOMING	
					WYOMING	
					WYOMING	
488	CAMBRIAN		WYOMING	WYOMING		
542	PRECAMBRIAN		WYOMING	WYOMING		