

NORTH DAKOTA STRATIGRAPHIC COLUMN



DEADWOOD WINNIPEG SUMMARY

DRILL STEM TESTS AND PRODUCTION MAPPING

Prepared by
Travis Stolldorf

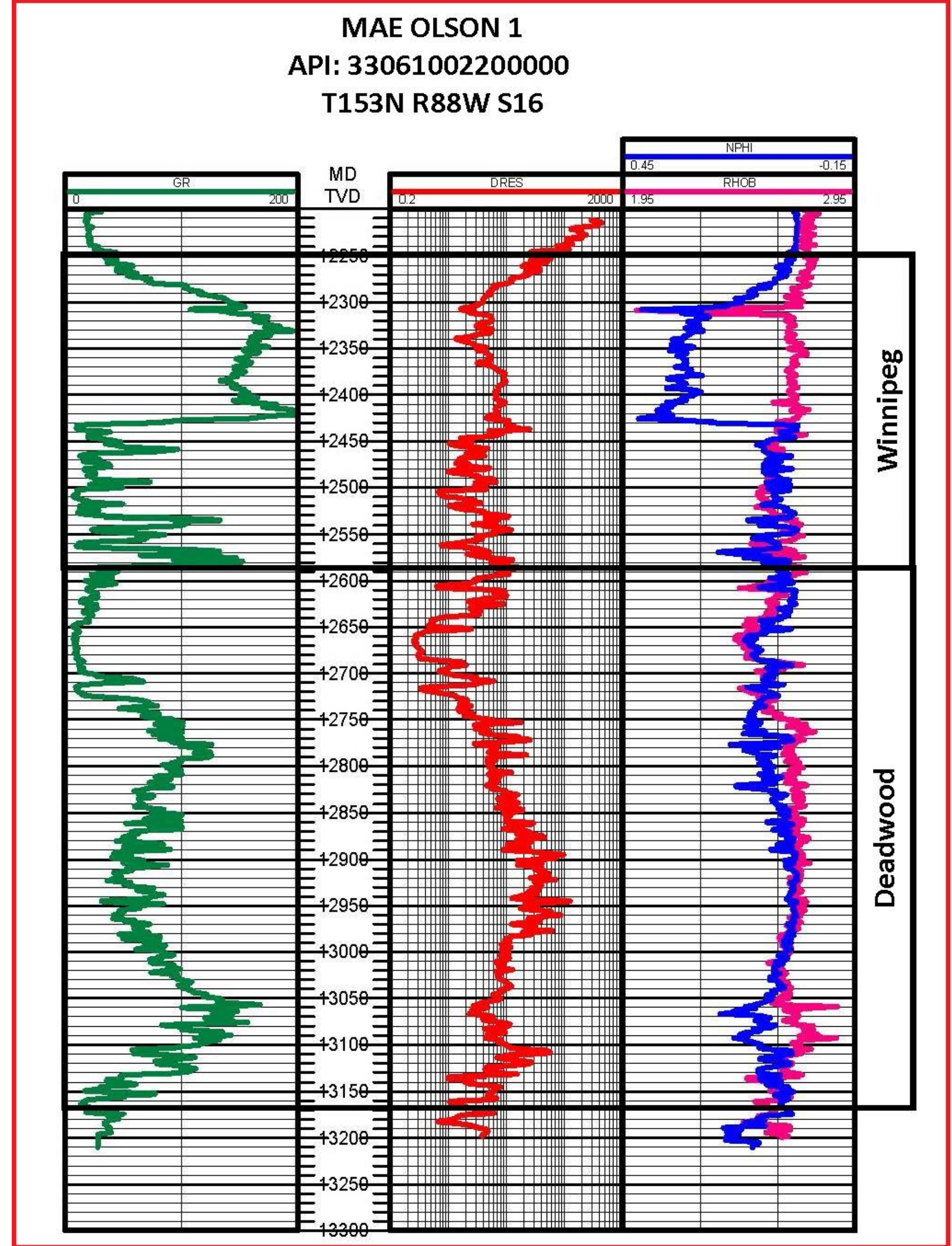
AGE MILLIONS OF YEARS BEFORE PRESENT	ERATHEM		SEQUENCE	ROCK UNIT			
	SYSTEM	SERIES		GROUP	FORMATION	MEMBER	
0.01	QUATERNARY	Holocene	TEXAS	OAHE	RIVERDALE		
		Pleistocene		COLEHARBOR	WEST CENTRAL	FICK CITY	
					AGASSIZ BROWN	MALLARD ISLAND	
2.4	NEOGENE	Pliocene	WHITE RIVER	(Unnamed Unit)			
5.3				Miocene	ARIKAREE		
23.0					BRULE		
33.9	TERTIARY	Eocene	GOLDEN VALLEY	CHADRON	SOUTH HEART		
						CHALKY BUTTES	
						CAMELS BUTTE	
55.8	PALEOGENE	Paleocene	FORT UNION	SENTINEL BUTTE			
				BULLION CREEK			
				SLOPE			
				CANNONBALL			
				LUDLOW			
				HELL CREEK			
65.5	CRETACEOUS	Upper	MONTANA	GREEN			
				COLGATE			
				BULLHEAD			
				TIMBER LAKE			
				YEMU CITY			
				ODANAH			
				DEGREY			
				GREGORY			
				FEMINA			
				GAMMON			
				NIORARA			
				CARLILE			
99.6	Lower	DAKOTA	COLORADO	GREENSHORN			
				BELLE FOURCHE			
				MOWRY			
				NEWCASTLE			
				SKULL CREEK			
				INVAN KARA			
145.5	JURASSIC	SWIFT	ARKANSAS	RIERDON			
				BOVES			
				FREMSON			
				ZAMPECO			
201.6	TRIASSIC	SPEARFISH	ARKANSAS	KLING			
				PICARD			
				DE			
				DUNHAM			
251.0	PERMIAN	MINNEKAHTA	ARKANSAS	SAUDE			
				PINE			
				BELFIELD			
				OPECHE			
299.0	PENNSYLVANIAN	MINNELUSA	ARKANSAS	BROOM CREEK			
				AMSDEN			
				ALASKA BENCH			
				TYLER			
318	BIG SNOWY	OTTER	ARKANSAS	KIBBEY			
				CHARLES			
				MADISON			
				MISSION CANYON			
359	DEVONIAN	LODGEPOLE	KANSAS				
				BAKKEN			
				THREE FORKS			
				BIRDBEAR			
				JEFFERSON			
				DUPEROW			
				SOURIS RIVER			
				DAWSON BAY			
				PRAIRIE			
				WINNIPEGOSIS			
	ASHERN						
416	SILURIAN	INTERLAKE	TIPPECANOE				
				STONEWALL			
				STONY MOUNTAIN			
				STOUGHTON			
444	BIG HORN	RED RIVER	TIPPECANOE				
				ROUGHLOCK			
				ICEBOX			
				BLACK ISLAND			
488	ORDOVICIAN	WINNIPEG	SAUK				
				DEADWOOD			
542	CAMBRIAN		SAUK				
	PRECAMBRIAN	STRUCTURAL PROVINCES	SAUK	WYOMING PROVINCE			
				TRANS-HUDSON OROGEN			
				SUPERIOR PROVINCE			

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 Deadwood and Winnipeg Formations' 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 Deadwood and Winnipeg Formations are highlighted by the red box on the North Dakota Stratigraphic Column on the left. A representative log of the Deadwood and Winnipeg Formations 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

