

# NORTH DAKOTA STRATIGRAPHIC COLUMN



# SPEARFISH SUMMARY

## DRILL STEM TESTS AND PRODUCTION MAPPING

Prepared by  
Travis Stollendorf

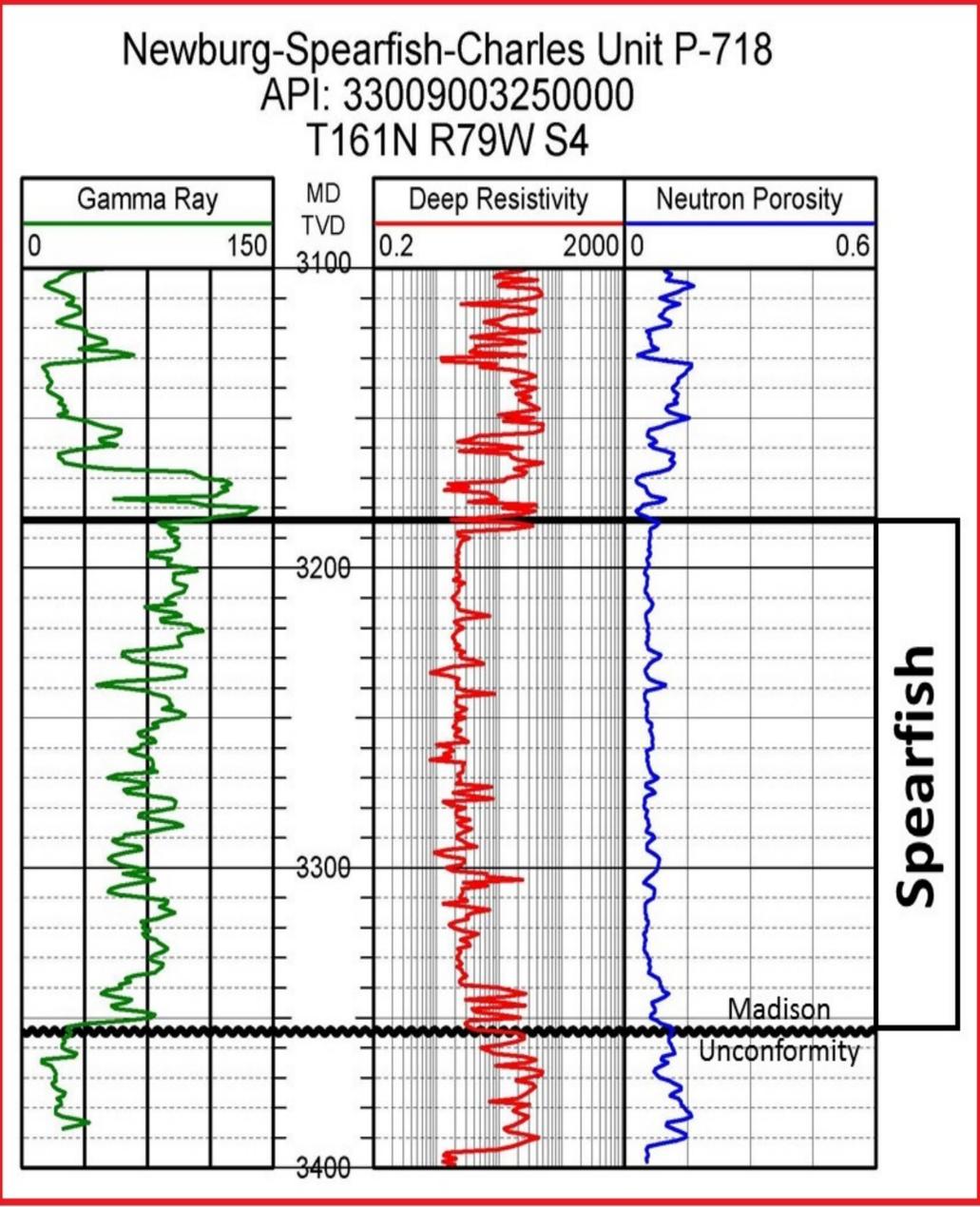
In order to better facilitate petroleum exploration and development in the Williston Basin, the North Dakota Geological Survey (NDGS) has published a series of production-related maps and corresponding data sets. These maps sets include production and drill stem test (DST) results with an accompanying 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 Spearfish 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 productive portion of the Spearfish Formation is highlighted by the red box on the North Dakota Stratigraphic Column on the left. A representative log of the Spearfish Formation is shown below along with a map showing the well's approximate location.

AGE MILLIARDS OF YEARS PRESENT	ERATHEM	SYSTEM	SEQUENCE	ROCK UNIT			
				GROUP	FORMATION	MEMBER	
0.01	CENOZOIC	QUATERNARY	Holocene		OAHE	RIVERDALE PEAK CITY AGGIE BROWN MALLARD ISLAND	
				WEST CENTRAL	EASTERN	PIEDMONT VALLEY	
		Pleistocene	COLEHARBOR			SHIBICA ROCKAWAY RIVER FALGONER BEET SNOOKVILLE WILEY RELEASE FALLS	
							SNOW SCHOOL BARRETT HENDERSON VALLEY MORNING HILL
							CHURCH PERRY CAMP GRANTON CANDON
		Pliocene	(Unnamed Unit)				
		Miocene	Arikaree				
		Oligocene	White River		BRULE		
				CHADRON	SOUTH HEARTY CHALAY BUTTES		
	Eocene	Golden Valley			CAMELS BUTTE		
						BEAR DEN	
	TERTIARY	PALEOCENE	PORT UNION		SENTINEL BUTTE		
	MESOZOIC	CRETACEOUS	Upper		HELL CREEK		
	Lower	MONTANA					
	Upper	COLORADO					
	Lower	DAKOTA					
	JURASSIC	SWIFT					
	TRIASSIC	PIPER					
	PERMIAN	SPEARFISH					
	MISSISSIPPIAN	MINNEKAHTA					
	CARBONIFEROUS	BROOM CREEK					
	PENNSYLVANIAN	MINNELUSA					
	DEVONIAN	BIG SNOWY					
	KANSASIAN	MADISON					
	DEVONIAN	LODGEPOLE					
	DEVONIAN	JEFFERSON					
	DEVONIAN	MANITOBA					
	DEVONIAN	ELK POINT					
	DEVONIAN	WYOMING					
	DEVONIAN	BIG HORN					
	DEVONIAN	WINNIPEG					
	DEVONIAN	SAUK					
	DEVONIAN	DEADWOOD					
	PRECAMBRIAN	WYOMING PROVINCE					



### 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

