



Williston Quadrangle, North Dakota

Salt Isopach of the Devonian Prairie Formation

Williston 100K Sheet, North Dakota

Horizontal	Color	Number
Collection	Method	Period
Scale	Year	Project

Adjoining 100K Maps

2019 Magnetic North
Declination at Center of Sheet
7°49'

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2021

General Information on the Prairie Formation

The Prairie Formation consists of a thick sequence of evaporites of middle Devonian age. At the time of deposition, open ocean water, at what is now the southern Northwest Territories of Canada, flowed through the interior of Canada via a corridor referred to as the Elk Point Basin. Water became increasingly concentrated with solutes as reefs restricted inflow from the open sea and as circulation was impeded by additional reefs forming on structural divides within the basin (Holter, 1969). The resulting brines deposited horizontally bedded salts over large areas including parts of Saskatchewan, southwestern Manitoba, northwestern North Dakota, and northeastern Montana. The deposition followed a typical progression of gypsum or anhydrite, followed by halite, sylvite, and carnallite. Alternating beds of halite, sylvite, and carnallite occurred when the introduction of fresh water into the system reversed the depositional sequence (Anderson and Swinehart, 1979; Kruger, 2014). These potassium-salt bearing intervals include extensions of those currently mined for potash in the Canadian province of Saskatchewan.

The Williston Sheet

The isopach contours of this sheet are based upon 220 well log interpretations of the tops and bottoms of the main body of salt, excluding the basal clay or anhydrite layer where observed. There is good well control throughout most of the sheet. The thickest salt deposits of this sheet are located in the northeastern corner, north of the town of Ray, where the depth to salt ranges from approximately 10,750 to 12,000 feet (3,277 to 3,658 meters) (Kruger, 2019). From this region, salt thicknesses thin to the south, southwest, and southeast. Measured thicknesses of the Prairie Formation salt within the sheet ranged from 0 to 379 feet (0 to 115.5 meters).

Thickness (ft)

1-25	201-225
26-50	226-250
50-75	251-275
76-100	276-300
101-125	301-325
126-150	326-350
151-175	351-375
176-200	376-400

Symbols

- Well Control
- Section Line
- City
- ⚡ Federal Highway
- ⚡ State Highway



Scale 1:100,000



Mercator Projection
Standard Parallel 48°10'10"N
North American 1983 Datum
Central Meridian 103°30'10"W

References:

- Anderson, S.B. and Swinehart, R.P., 1979, Potash Salts in the Williston Basin: Economic Geology, v. 74, no. 2, p. 358-376.
- Holter, M.E., 1969, The Middle Devonian Prairie Evaporate of Saskatchewan: Saskatchewan Department of Mineral Resources, Rep. 123, 134p.
- Kruger, N.W., 2014, The Potash Members of the Prairie Formation in North Dakota: North Dakota Geological Survey, Report of Investigation no. 113, 39p.
- Kruger, N.W., 2019, Measured Depths to the Prairie Formation Salt: North Dakota Geological Survey, Geological Investigation no. 221, Plate II.