Salt Isopach of the Devonian Prairie Formation

Stanley 100K Sheet, North Dakota

2019

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 waters extended across what is now the southern Northwest Territories of Canada, based on the interior of Canada as a coral reef. The Prairie Formation, following a typical progression of gypsum or anhydrite, halite, sylvite, and carnallite, was deposited in a carbonate-evaporite sea and circulation was impeded by additional reefs forming onshore. Initially, the reefs deposited horizonally, laterally salted out 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, halite, sylvite, and carnallite. Alternating beds of gypsum or anhydrite followed by halite, sylvite, and carnallite occurred when the introduction of fresh water into the system increased the salinity of the reservoir (Standing and Bernstein, 1979; Kruger, 2018). These potash and sodium minerals resulted from evaporative concentration of brines in the Canadian province of Saskatchewan.

The Stanley Sheet

The isopach contours of this sheet are based upon 232 well logs, which provide information on the tops and bottoms of the main body of salt, excluding the basal clay or anhydrite layer where it is observed. Closely spaced contours depict localized thinning of salt overlying a thick reef. The total extent of the sheet was mapped near the middle of the northern boundary, excluding the basal clay or anhydrite layer where it is observed. The isopach contours follow a general trend of thicker beds to the south and southeast, particularly along the northern and southern limits. The thickest salt deposits of this sheet were mapped near the middle of the northern boundary, approximately 12 miles north of the town of Stanley at depths exceeding 10,000 feet (3,048 meters) (Kruger, 2015), and along the eastern limits (near the city of Stanley) where thickest salt deposits are known, approximately 12 miles north of the town of Stanley at depths exceeding 10,000 feet (3,048 meters) (Kruger, 2015).

Thickness (ft)

Symbols
- Well Control
- Other Features
- Section Line
- City
- Federal Highway
- State Highway

Scale: 1:16,000,000

References:


Core Workshop Volume, D.W. Fischer (eds.), p. 1


Kruger, N.W., 2015, The Potash Members of the Prairie Formation in North Dakota: North Dakota Geological Survey, Report of Investigation no. 113
