Salt Isopach of the Devonian Prairie Formation
Hazen 100K Sheet, North Dakota

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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 marine water, at what is now the southern Northwest Territories of Canada, flowed through the interior of Canada as a seaway referred to as the Ibb-Rift Basin. Water became increasingly concentrated with salts as reefs extended cattle and the open sea was restricted. Circulation was impeded by additional reefs forming an inter-structural channel within the basin (Johnson, 1968). The resulting brine deposited horizontally laminated salts over large areas, including parts of Saskatchewan, southwestern Manitoba, northeastern North Dakota, and northwestern Montana. The deposition followed a typical progression of gypsum or anhydrite, followed by halite, sylvite, and carnallite. Alternation lent of both, sylvite and carnallite assumed when the introduction of fresh water into the system reversed the depositional sequence (Johnson and Harvey, 1979; Kruger, 2004).

There are six potash-containing members identified in the Prairie Formation units of North Dakota. From lowest to highest, these are the Onganiphycus, White Bear, Belle Plaine, Flaxcombe, Maurice, and White Bear members (Kruger, 2014). These potash-rich bearing intervals include extensions of those currently mined for potash in the Canadian province of Saskatchewan.

The Hazen Sheet

The isopachs on this sheet are based upon well logs and interpretations of horizons and boundaries of the main body of the salt. Many wells located on adjacent sheets and evaluate the basal clay or anhydrite layer where observed. The salt deposits on this sheet are located north of the northwestern corner and are projected to only extend several miles into the sheet before disappear across the basin (Hazen, 2014). The mapped area is shown in the northwestern corner of the sheet. Where salt is projected to occur, the depth to salt is estimated to be approximately 15,000 feet (5,000 meters) (Hazen, 2014).

Symbols

- Well Control
- Other Features
- Line
- Federal Highway
- State Highway
- Natural Gas Gathering System
- Natural Gas Transportation System
- Oil Gathering System
- Oil Transportation System
- Road
- River

References

Holt, W.D., 1989, Thickness and Extent of Prairie Prairie at the North Dakota Geological Survey, Geological Investigation no. 221, Plate II.
Kruger, N.W., 2019, Measured Depths to the Prairie Formation Salt: North Dakota Geological Survey, Geological Investigation no. 221, Plate II.