K₂O Grades of the Mountrail Member of the Prairie Formation
Crosby 100K Sheet, North Dakota

Ned W. Kruger
2018

This series of maps of the Crosby 100K Sheet was based on public data from 225 wells gathered by the North Dakota Industrial Commission - Department of Mineral Resources, beginning in 1975. Some potash member isopach thicknesses were identified on the geophysical logs of 37 wells. Isothicknesses were generated via PETRA (v. 3.9.13) software utilizing a grid size of 354 rows and 1 column. The contour lines were computer-generated and subsequently adjusted by the author. Areas with geological anomaly may not be accurately portrayed. The potash member thickness for each well, and the isopach contours generated from them, were modified from Kruger (2014).

All calculations were based on gamma-ray log measurements recorded as API units taken at a steady increments throughout the potash-containing portion of the Prairie Formation. The thickness was calculated as the log peak response minus the log trough response as well as mineral of the baseline gamma-ray signal when available (Crain, 2014). Crain and Austin (1966). The corrected gamma-ray measurements were converted into equivalent potassium weight (K₂O) concentrations. The gamma-ray response for the potash member thickness was obtained using the gamma-ray method described in Nelson (2007), where both thicknesses is equal to the distance between the elevations at which the gammaray responses decline to one-half its maximum value.

When a potash member displayed multiple gamma-ray log peaks separated by troughs representing salt or anhydrite, the potash interval at the upper or lower boundaries of the number was not included in thickness or average potassium calculations. Multiple gamma-ray peaks separated by more than four feet from any body of the potash member. This occurs more frequently in deposits of the White Butte Member, which may appear as one or two stratigraphic units separated by an interval of halite.

References: