K₂O Grades of the Esterhazy Member of the Prairie Formation
Minot 100K Sheet, North Dakota

This series of maps for the Minot 100K Sheet was based on public data from 35 wells gathered by the North Dakota Industrial Commission – Department of Mineral Resources, Oil & Gas Division. The Esterhazy Member was identified on the geophysical logs of 17 wells. Isopach contours were generated via FTMX (rev. 3.3.1.2) geological software. The contour lines were computer-generated based on well control data only, with minimal adjustments made by the author. Areas with a palaeogeographical anomaly may not be accurately portrayed. If a palaeo member is not well exposed, the isopach contours generated from there, were modified from Kruger (2014).

All calculations were based on gamma ray log measurements recorded in API units taken at six-inch increments throughout the palaeo member receiving portion of the log. Corrections for tube size and drift have not been made as removal of the baseline gamma ray signal was made (Coom, 1994). Coom and Anderson (1996). The corrected gamma ray measurements were converted into apparent potassium weight percentage concentrations. Average K₂O concentrations and palaeo member thicknesses were obtained using the penetrability method described in Nelson (2007), where bed thickness is equal to the distance between the intersections at which the gamma ray response decreases to one-half its maximum value.

When a palaeo member displayed multiple gamma ray log peaks separated by boring representing soft or eroded layers such as clay or silt, the palaeo member intervals at the upper or lower boundaries of the member were not included in thickness or concentration measurements. When a palaeo member contained multiple separate log measurements were less than 100 API or separated by more than two feet from main body of the palaeo member. This occurred most frequently in deposits of the White Bear Member, which may appear as one or two palaeo-rich beds, undergoing a thin palaeo containing some separated by an interval of shale.

The volume of potassium within the Esterhazy Member as represented on this sheet is approximately 2,795,000 acre feet.

References: