INTRODUCTION

Significant volumes (11 million barrels) of produced water are generated daily during production operations for oil and gas in North Dakota. Most produced water is treated on-site and re-injected, while very high

THE DAKOTA GROUP

Overlying the Dakota Group are several thousand feet of Cretaceous marine deposits including the Pierre Formation, a very thick, impermeable unit. The Pierre Shale Formation unconformably underlies the Dakota Group and consists of an average of 425-1,199 ft (130-364 m) of marginal marine sediments with diminished thicknesses. The Dakota Group is approximately 730-1,210 ft (223-370 m) thick at depths of approximately 4,710-5,410 ft (1,440-1,650 m) in the center of the Killdeer 100K area.

DISPACH OF INYAN KARA FORMATION SANDSTONES

This map presents thickness contours (isopachs) of interpreted capillary block boundaries present within the Inyan Kara Formation in the Killdeer 100K. The map and associated cross-sections were prepared in order to identify favorable areas where the potential for recovering capillary block sands for injection of produced water is greatest. Thickness contours on the map are presented in feet (meters). The areas shown on this map are underlain by the Dakota Group. Individual capillary block sands are not shown individually on this map. Thickness contours on the map are interpreted to show lateral continuity of capillary block sands. The underlying Dakota Group provides a seal and yields the capillary block sands, after removal of capping layers that will not contain injected fluids within the Inyan Kara. The Inyan Kara is present only at the subsurface of the Killdeer 100K in North Dakota extending across most of the state. The formations range in thickness from approximately 250-800 ft (75-244 m) in the Killdeer 100K.

CROSS-SECTIONS

In order to indicate potential valley geometries in cross-sections, the map was cross-referenced with the Generalized Floodwater Hyperbola of 100% Shoreline Base Elevation 1006. Shown as dotted layer and depicted on the map.