CASE STUDY OF INTEGRATED APPROACH TO THE CLEANUP OF OGALLALA GROUNDWATER IMPACTED BY OILFIELD BRINE, HASKELL COUNTY, KANSAS

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In 1983 it was discovered that an injection well was found to have released chloride-rich oilfield brine into the groundwater of the Ogallala aquifer near Satanta, Haskell County, Kansas. Monitor wells installed in 1984-1989 indicated that the brine was confined to a paleochannel incised into the Cretaceous Blanco Formation at the base of the Ogallala aquifer and was moving down the topographic gradient in the channel. The channel axis lies at about 419 feet below ground surface (ft bgs) in the southeast part of the site, where the depth to groundwater was about 320 ft bgs. In 1992-1993 four recovery wells were installed to extract the brine, which was disposed of in a replacement injection well. Brine-recovery rates were restricted by the limited capacity of the injection well.

In 2002 Pioneer Natural Resources USA, Inc. used an integrated approach to reassess remediation and disposal alternatives. All available wells were sampled for chloride, a 72-hour aquifer test was performed to evaluate aquifer parameters, groundwater modeling was performed to optimize locations of new recovery wells, and a magneto-telluric survey was conducted to delineate the chloride plume and subsurface stratigraphic features. Based on these analyses, two additional recovery wells were installed at the site. Recovered brine is currently directed to a nearby subsurface water-flood project, thus removing the limit on extraction rates and expediting the cleanup of the oilfield brine.