geoconvention
Calgary • Canada • June 20-22 2022

An Overview of Saskatchewan's Base of Groundwater Protection Mapping Project

Arden Marsh
Saskatchewan Geological Survey, Saskatchewan Ministry of Energy and Resources

Summary

This presentation will outline some of the work that has been done to map the Base of Groundwater Protection throughout southern Saskatchewan. The purpose of this project is to map the stratigraphic horizon that separates fresh groundwater aquifers from saline groundwater aquifers, which can then be used to delineate the depth at which surface casing in petroleum and natural gas (PNG) licensed wells should be set for any given location within the province, so that fresh groundwater aquifers are isolated and protected from contamination.

Shallow aquifers within Saskatchewan water wells that contain fresh groundwater have been studied in detail with respect to stratigraphy and hydrogeology, dating back to the 1930s. Many studies using data from PNG wells in Saskatchewan have also been completed over the years that are typically related to strata below fresh groundwater. In this study, data derived from both PNG and water wells is being used to define the base of fresh groundwater.

In 2019, the Saskatchewan Ministry of Energy and Resources (ER) made amendments to the directive relating to the requirements for abandoning a PNG licensed well in Saskatchewan (Directive PNG015: Well Abandonment Requirements). The changes to Directive PNG015 that are of interest to this study are related to whether or not the well has sufficient surface casing in place to protect and isolate fresh groundwater from contamination from the wellbore.

All PNG wells in Saskatchewan are drilled to depths that are below the base of viable fresh groundwater aquifers. The definition of fresh water from ER Oil and Gas Conservation Regulations, 2012 is "water that has a total dissolved solids concentration of less than 4000 milligrams per litre". Fresh groundwater in Saskatchewan is found within aquifers that are from tens to a few hundred metres below the Earth's surface.