From: McDonald, Jeffrey
To: "Gilmore, Tyler J"
Subject: RE: Salinity in Ironton Sandstone
Date: Wednesday, December 11, 2013 2:56:00 PM

Thanks.

Jeffrey R. McDonald, Geologist
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From: Gilmore, Tyler J [mailto:tyler.gilmore@pnnl.gov]
Sent: Friday, December 06, 2013 3:43 PM
To: McDonald, Jeffrey
Subject: Salinity in Ironton Sandstone

Jeff,
In follow-up to our phone conversation last week where you asked the question if we had a resistivity log for the Ironton-Galesville Fm and if we used the resistivity log to calculate salinity for the formation. The short answers are yes, and yes. Below is more information on how we derived salinity for the Ironton-Galesville Fm. A log derived value for salinity was determined and checked against literature values for verification.

1) Schlumberger provided a salinity log from the stratigraphic well in what is called the "ELAN log". This "calculated salinity" log is computed from the resistivity and porosity (with a function of temperature). After discussions between experts from the FutureGen team and Schlumberger, it appears that the "calculated salinity" values need to be used cautiously since assigning specific salinity concentration levels for a particular formation could be an over-extension of wireline log information.

Since no other value is currently available for the Ironton-Galesville formation, an arithmetic mean of the Schlumberger "calculated salinity" was determined and reaches **14.88 g/kg** (depth 3330 to 3438.5 ft KB). The resistivity data from the ELAN log is included in an attached graphic along with several other geophysical log results coming from the Schlumberger ELAN log along with plotted sidewall core data points.

2) Salinity data on the Ironton-Galesville aquifer in the literature in the vicinity of the FutureGen site is sparse. According to Kolata and Nimz (2010) and Lloyd and Lyke (1995), the Ironton-Galesville is the most consistently productiveaquifer in the northern third of Illinois. However, in the remainder of thestate, groundwater in the Ironton-Galesville **is too highly mineralized for most uses** (see attached map Ironton-Galesville-TDS_Lloyd1995_V1).

The FutureGen 2.0 injection site is located to the southeast of the 10,000 mg/ldissolved-solids concentration line. The salinity value determined using Schlumberger computed log is consistent with what is known regionally.

Please call if you have any other questions.
Thanks
Tyler