HYPOTHESIS OF A NATURAL BRINE PUMP CAUSING PERSISTENT BRINE SCARS IN THE TALLGRASS PRAIRIE, OKLAHOMA

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This presentation describes the continuation of efforts to understand a persistent brine scar. The study was conducted at Site 3 in the Tallgrass Prairie Preserve in Osage County, Oklahoma. Drilling at Site 3 was done in the 1920s. Remediation studies were done at the site, but all remediation attempts have failed. Our study is an attempt to understand why the site will not remediate. Previous work done at the site (2004) led to a hypothesis of a “natural brine pump” that moves brine coming to the surface through diffusion and advection. An EM-31 survey was done, that shows high conductivities throughout the scar. The survey did not adequately test the hypothesis of the brine pump. A deep survey using an EM-34 was then conducted with 10, 20, and 40 meter ring spacing. Contour maps of the apparent conductivities were produced and do not seem to support the hypothesis of a single brine pump around the well, but instead suggest multiple sources of the brine. We believe we have located 3 additional wells that are contributing brine to the scar and that the dominant transport mechanism is flow along fractures and bedding planes that are acting as aquatards.