Laboratory measurements of Skempton’s B Coefficient on Wolfcamp A Core, Delaware Basin, USA
Landon Lockhart, The University of Texas at Austin

ABSTRACT

I present my current experimental work on measuring Skempton’s pore pressure buildup coefficient ($B$) values on Wolfcamp A mudrock. This is a material coefficient that defines the undrained change in pore pressure due to a change in isotropic load. I measure a $B$ value of 0.12 (Fig. 1) at my sample’s present-day effective stress of 3,716 psi. Using this preliminary $B$ measurement, I demonstrate that the pressure of my sample before erosion (unloading) was 7,839 psi (Fig. 2).

The use of a pore pressure buildup coefficient is a key input into my pressure prediction model, which I present in UT GeoFluids Talk 14.03; currently, I assume a $C$ value (which is termed the ’uniaxial loading efficiency,’ and can be mathematically transformed to $B$) of 0.8. The aim of my experimental work is to obtain reliable $B$ values for my material and use these to replace my current assumed value.

Fig 1: Preliminary measurements of B coefficient (black squares) during two load-unload stress cycles between the sample’s inferred preconsolidation pressure of 3,535 psi, and its in-situ effective stress of 2,254 psi. Back pressure is held constant at 1,000 psi. Open diamonds illustrate previous measurements from neighboring wells.

Fig 2: Estimation of my sample’s pre-erosion pore pressure based on my preliminary Skempton’s $B$ value (Fig. 1) which I experimentally measured in the lab, assuming an in-situ pore pressure of 7,071 psi and an erosional value of 6,890 ft. In this figure, $B$ is mathematically transformed into a uniaxial loading efficiency, $C$. 
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