# Influence of Lithology on Vertical Anisotropy of Permeability at a Field Scale for Select Louisiana Geologic Units

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## ABSTRACT

**Vertical permeability and vertical anisotropy of various geologic units in Louisiana have been determined by previous workers, but generally at laboratory scale. Also, in the past generally, estimates have been used for modeling studies. However, field-scale values of vertical permeability and anisotropy are more appropriate and valuable for most studies. This initial study determines field values of vertical anisotropy of permeability directly from field-size well tests. Laboratory-scale values can not replace field-scale values.**

**Analysis of well tests of horizontal holes can yield vertical permeability and anisotropy at field scale. During the past 25 years thousands of well tests including hundreds for horizontal holes have been completed for various units in Louisiana and are available in the Louisiana Department of Natural Resources SONRIS (Strategic Online Natural Resource Information System) database. Only well tests that yielded a single fluid were selected to be analyzed for vertical permeability. Dozens of well tests for horizontal holes within the Austin Group and James and Haynesville formations meet the single-fluid criteria for analysis of vertical permeability. Although SONRIS records do not specify perforated zones as being horizontal, lengths between 4,000 and 10,000 feet clearly indicate a horizontal hole because none of the units considered are that thick anywhere in northern Louisiana.**

**Initial analysis of results yields the following ratios of geometric mean permeability of vertical to horizontal holes: Austin Group ratio, 1,100:1, Haynesville Formation ratio, 6:1, and James Formation ratio, 58:1. Further analysis indicates that horizontal permeability is typically hundreds to tens of thousands of times larger than vertical permeability.**

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