Using Wireline Spectral Gamma to Infer Depositional Environments in Unconventional Resources

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ABSTRACT

In geology it is often said the present is the key to the past. Countless examples can be cited for conventionals and modern depositional analog equivalents. In unconventionals this adage is a problem as most plays were deposited in shallow epeiric seas which for the most part do not exist in modern environments. Due to this phenomenon many unconventional plays cannot use classic facies identification for the most productive zone from modern analogs. An unfortunate result of this can be landing unconventional wells statistically and then deciding which zone is best by production over time. While effective it can be costly and speeding up the determination of the most productive zones without known production would significantly increase project economics.

Much work has been done by professionals to understand shale organic deposition and preservation using laboratory experiments. These advancements have allowed for more detailed understanding of the water depth of these rocks during deposition as well as heterogeneity. Using these learnings this paper has attempted to use the spectral gamma to infer depositional environments for unconventionals that can be applicable on a multiplay/basin analysis. The goal of this study is to associate depositional environments with specific rock types from logs in hopes of mimicking the success our industry has had from conventional research. The spectral gamma ray will be the primary tool used to determine depositional environments, but success of the prediction will be associated with productive wells. The quicker specific facies can be targeted in unconventional play development will inherently increase NPV by reducing the number of statistically landed wells.