

High fidelity property prediction in the Delaware Basin

Seismic data contain valuable spatial information on geological variations between and away from well locations. However, the process of extracting the geological information from the seismic amplitudes is non-trivial. In this presentation, we will describe a pre-stack seismic inversion study in the north-east Delaware Basin, with the specific objective of obtaining reliable estimates of the geology across the 380 square mile study area. The results are expected to provide operators with an accurate model of the subsurface geology for resource exploitation and development.

The workflow applied in the study was built on an understanding of the rock properties from a regional database of 14 wells. The seismic data were acquired in 2017 using point source-receiver technology and a maximum fold of 396. A Bayesian pre-stack seismic inversion approach was used that simultaneously solves for both facies and impedances, without the requirement of a conventional low frequency model. This approach is particularly advantageous when dealing with the laterally discontinuous geology of the Bone Spring and Wolfcamp formations. The presentation will cover some of the key observations and workflow applied from the study as well as a review of the results obtained.