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Seismic reservoir characterization of the Bone Spring and Wolfcamp formations in the Delaware Basin with efforts at quantitative interpretation - Part 2

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Following from Part 1 of this talk, we will explain the characterization of the Wolfbone and Barnett/Mississippian formations in the Delaware Basin in terms of rock physics parameters derived from impedance inversion and characterizing the formation of interest by following a robust workflow.

Beginning with the available well log curves and correlation with seismic data, impedance inversion and rock physics analysis, we have tried to characterize the Bone Spring, Wolfcamp and Barnett intervals, in terms of local sweet spots. The workflow adopted included the preconditioning of the seismic data, the generation of the low frequency models to be used in the impedance inversion, and the challenges in the estimation of shear curves when not much shear log control is available.

Thereafter, we discuss the challenges and uncertainty in the characterization of shale formations using rock physics analysis in terms of estimation of volume of shale from well log data, uncertainty in the estimation of water saturation and porosity, and why the rock physics templates traditionally applied in conventional reservoir characterization where shales, sands and carbonates are to be distinguished fall short of the objective in shale resource plays.

We follow this work with adoption of a statistical approach for the characterization of unconventional plays wherein we first demonstrate how the *type*, *volume of shale* and *effective porosity* of a formation can be determined using well log data with a *graphical cross plot method*. This approach is then taken forward to its application on seismic data such that the sweet spots can be determined and present clear identification of pockets that are more prospective and would help interpreters work with them in their asset teams.