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Capturing Bulk Rock Volume (BRV) Uncertainty- A workflow incorporating seismic (pre-stack and post stack data) and well data

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In the Trinidad region, one of our biggest subsurface uncertainties and sensitivities in our original gas in place (OGIP) calculations is the bulk rock volume (BRV) of our reservoirs. This uncertainty is a result of the geological complexity of our fields due to the presence of shallow gas, the regional and counter-regional faults, stacked pay segments, and reservoirs with multiple flow units. Often, we have limited well control with one or two wells either located on the crest of the structure or on one flank of the structure.

Previous methods used to capture BRV ranges did not always incorporate all the data available. In this case study, we use a data-driven depth uncertainty workflow to assist us in ensuring that we have a robust geophysical interpretation and a more suitable range of BRVs for our reservoirs. This workflow captures velocity uncertainty by incorporating seismic data and the products created during the processing such as pre-stack data, the velocity model, gamma and reflectivity volumes.

Data quality control is an important step in the process allowing us to determine the reliability of our data and what methods can be used to produce technically sound structural variations. The residual moveout of the gathers can tell us about the validity of our velocity model and what areas of the model may require adjustments (either an increase or decrease in the velocities). The workflow also employs the pseudo point method in producing tied surfaces for the reservoirs, constrained by the observations from the velocity and gathers, to flex the structure. Lastly, the geophysical data and observations are integrated with non-geophysical data types (dynamic data and petrophysics) to help refine the range of BRVs. The combination of methods produces a range of plausible BRV scenarios that are defendable and supported by data.