On the Path to a Commercial Unconventional Play in Argentina: De-Risking of the Vaca Muerta Resource Play, Neuquen Basin

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ABSTRACT

Unconventional resource play economics are commonly driven by reducing development costs while at the same time, achieving maximum hydrocarbon recovery. Control of costs is hindered in the international arena, where drilling activity and the rate of learning is relatively low when compared to North American unconventional plays. In Argentina, Shell managed costs by deliberately scaling and pacing its appraisal plan to efficiently learn and de-risk its operated blocks (Sierras Blancas and Cruz De Lorena). Results to date show the importance of integrating concept of knowledge hubs with multi-disciplinary focused approach for data collection, derisking and production strategy and path forward with reservoir management. The derisking strategy is built around the concept of "knowledge hubs" (local areas where extensive static and dynamic data are gathered from 1 to 3 wells), which included logs, geomechanics, geochemistry, core, PLTs, microseismic, chemical tracer, NRT proppant and pressure response data among others in order to facilitate a detailed understanding of vertical and lateral distribution of rock and reservoir properties, understand frac barriers and simulated rock volume. We created rock types using learnings from our data acquisition program at the core and log scale and translate them into the seismic scale. With the use of seismic inversion techniques, we are able to predict vertical and lateral reservoir properties away from the well bore. Integration of data through knowledge hubs have provided significant learning on the importance of landing zone, presence of frac barriers, frac height and indication of SRV. The integration and interpretation of well and seismic data indicates a potential dual layer development. Geomechanics model was calibrated from data at one of the knowledge hubs, which was then coupled with reservoir model to provide further insight into reservoir management by looking at the interplay of completion, spacing, production and value. Continued multidisciplinary learning starting with sequence stratigraphy mapping, rock facies analysis and prediction of rock properties through the blocks, coupled with integration of this data in the knowledge hubs with production data and numerical reservoir modeling, has further advanced our understanding on the development prospective of the VM and opened up the potential of two development layers.