THE GEOLOGICAL SOCIETY OF TRINIDAD & TOBAGO

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A Whirlwind Tour of Shell Seismic Technologies Employed in the NCMA Basin

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Theme: FG: Geophysical techniques

Key Words: seismic reprocessing, seismic volume interpretation & technologies, portfolio maturation

NCMA prospectivity is highly seismic amplitude driven and uncertainties include reservoir extent, NtG distribution, saturation, and lateral and vertical reservoir connectivity. Multiple technologies were applied in this project to polarize Tobago basin prospectivity and de-risk key uncertainties.

This effort included the joint reprocessing of two legacy streamer surveys - NCMA-4 and Block 22. The seismic processing faced various challenges:

1) A streamer merge with different acquisition parameters, varying degrees of noise, feathering, and suboptimal fold coverage - especially for the shallow depths and small offsets.
2) Varying seafloor depth and surface related multiples with very short to long periods.
3) Overburden shallow gas with low seismic velocities and high absorption creating imaging challenges at the reservoir level.
4) Amplitude preserving, high resolution processing throughout as a prerequisite for subsequent QI and pre-stack amplitude interpretation. QI was integral to QA/QC at every key step, ensuring amplitude compliance.

An overview of the principal processing, model building and imaging steps that resulted in more reliable, higher resolution seismic images will be provided. With the reprocessed seismic as a backdrop, advanced volume interpretation workflows were utilized to support identification of depositional environments, quantification of the seismic response and establishment of acreage-wide prospectivity via a deep learning screening tool. Examples of these applications will be discussed in the context of assisting reduced cycle times for prospect maturation and portfolio generation.

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This project demonstrates how leveraging Shell's toolbox of advanced technologies and working as a natural team across disciplines is the key to the understanding of subsurface opportunities and risks.