

How to create mis-ties beneath the Mannville coals

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Summary

The Glauconitic Sandstone, Ostracod Beds and Ellerslie Member in the Mannville group are a major exploration target in Western Canada. These formations are overlain by the Top Mannville and Medicine River coals that produce various complex seismic wave phenomena that can affect illumination in the target zone. Seismic-to-well ties in this area have historically exhibited large errors, where mis-ties are often seen directly at the target level. These errors are attributed to complex interbed multiple generation and transmission filtering effects (Coulombe and Bird, 1996).

In this study, we investigate the mis-ties beneath the Mannville coals by attempting to reproduce the mis-ties as seen in field data. From well logs, we model the seismic response using a simple convolutional model. In addition, the concept of layer induced long-wave elastic attenuation as presented by Liner (2014) was used to investigate the effects of Q attenuation as a non-stationary filtering process. Finally, the effects of deconvolution were investigated. It was found that the mis-ties were primarily due to wavelet errors in the deconvolution operator design process and are manifestations of artefacts resulting from the deconvolution itself.

References

- Coulombe, C. A., and Bird, D. N., 1996, Transmission filtering by high-amplitude reflection coefficients: Theory, practice, and processing considerations: *The Leading Edge*, **15**, no. 9, 1037-1042.
- Liner, C. L., 2014, Long-wave elastic attenuation produced by horizontal layering: *The Leading Edge*, **33**, no. 6, 634-638.