Novel Multi-resolution Log Tracking Technique Enables High-resolution Sonic Answers

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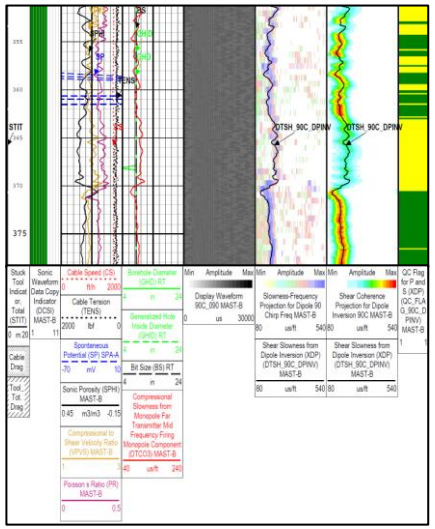
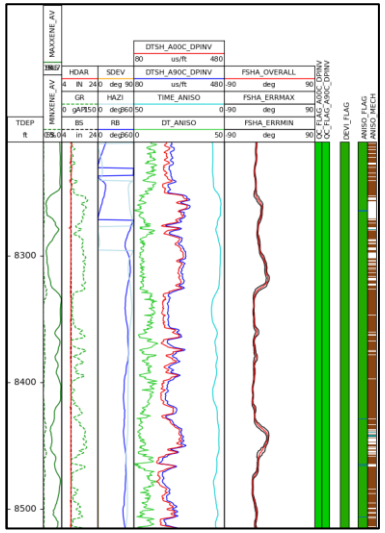
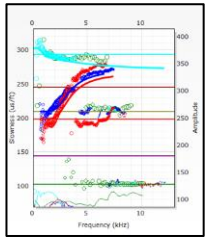
Digital Transformation

DEVEX2022

Wellsite Digital



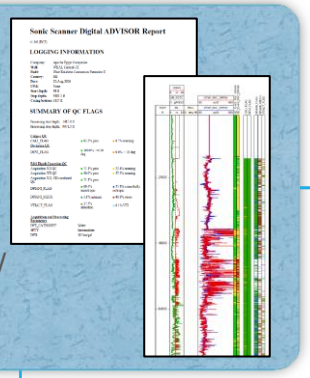




Wellbore Space - Cloud

Digital Sonic Advisor Report

- Summarize QC
- P & S
- Dipole Anisotropy
- Applications



Additional products

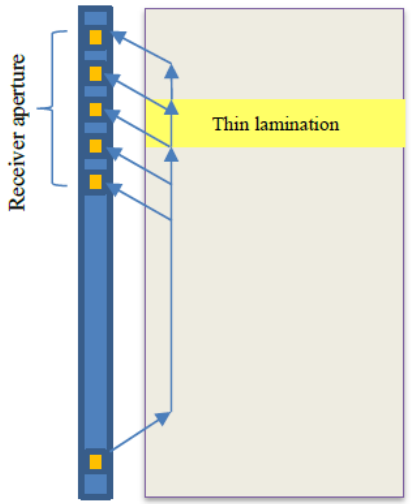
One-Click

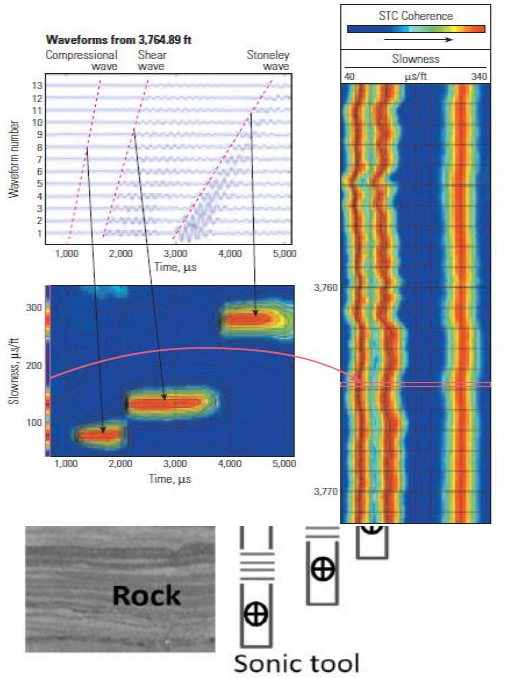
- Multi-Res Sonic
- Auto-Shear extraction
- TI anisotropy
- Radial profiling

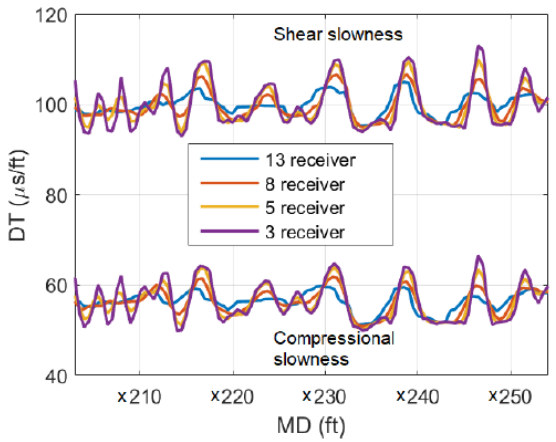
Actionable Insights

Multi-Resolution Sonic

- Thin layers
  - Thickness < receiver aperture
  - Monopole wave
- Multi-shot processing to enhance resolution
- Identifying thin layers:
  - Stimulation design
  - Rock physics models
  - Core-log integration
  - Weak/strong bedding planes

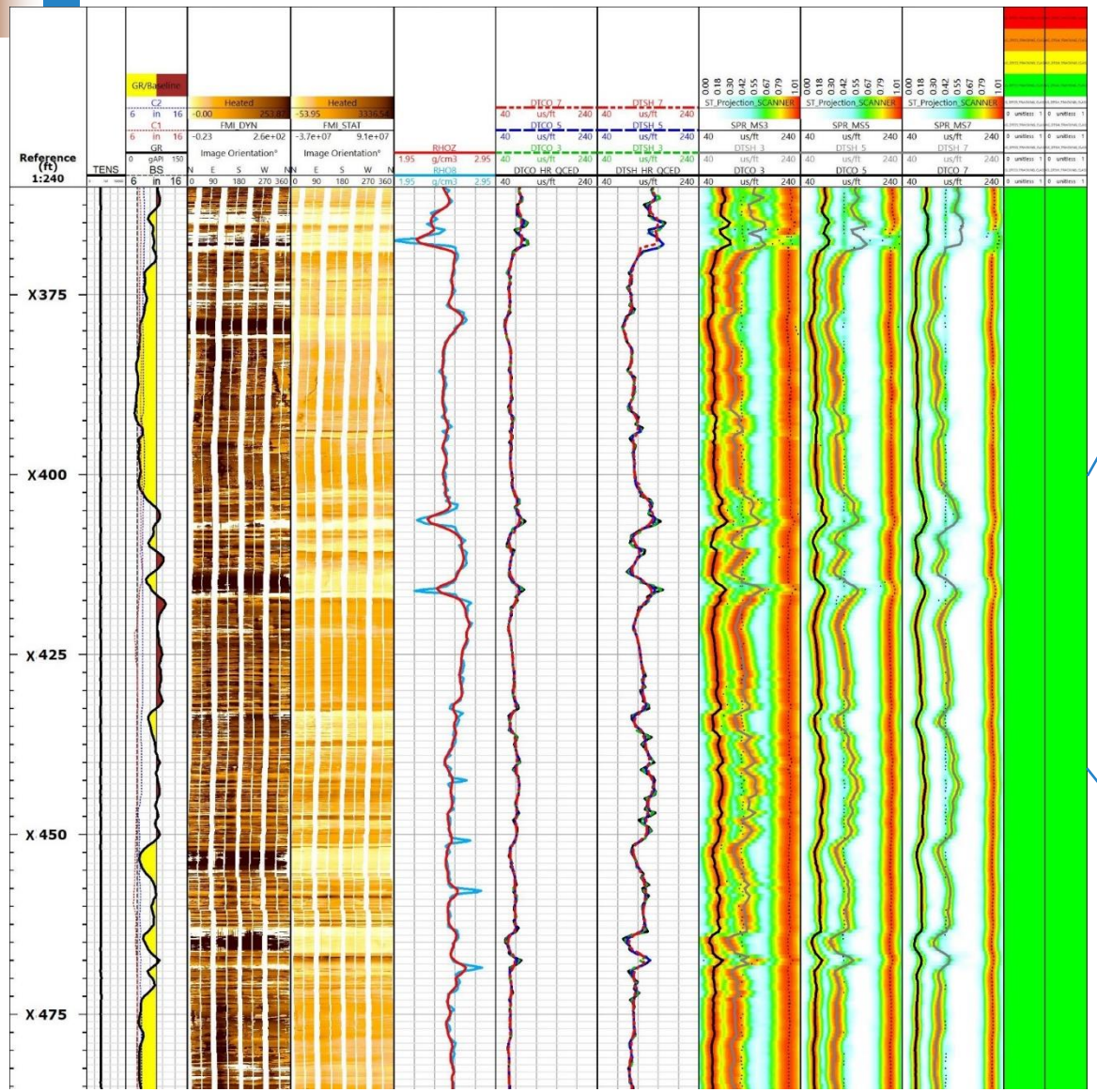


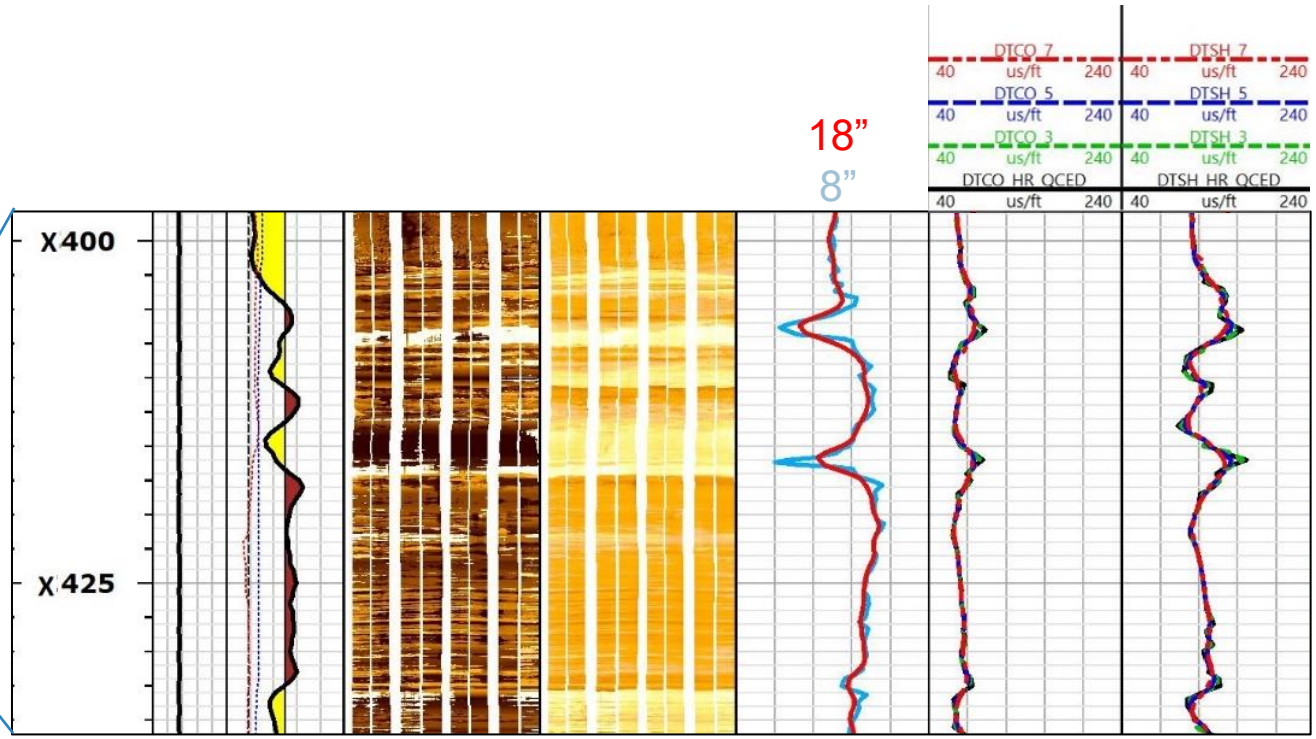




Sub-array or multi-shot processing

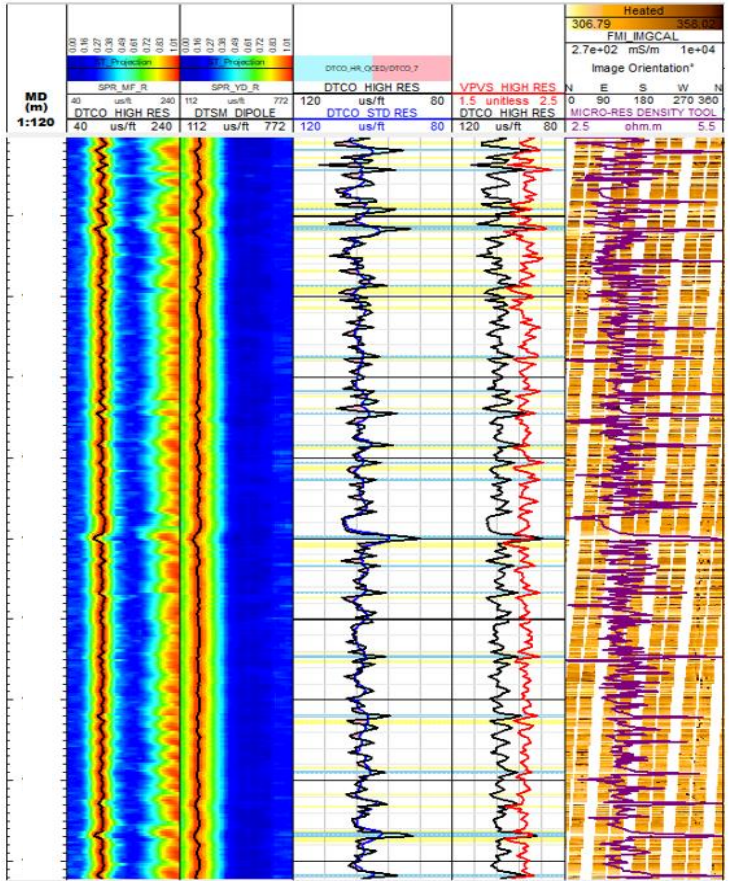
High-resolution DT Comparison to Image & HR Density

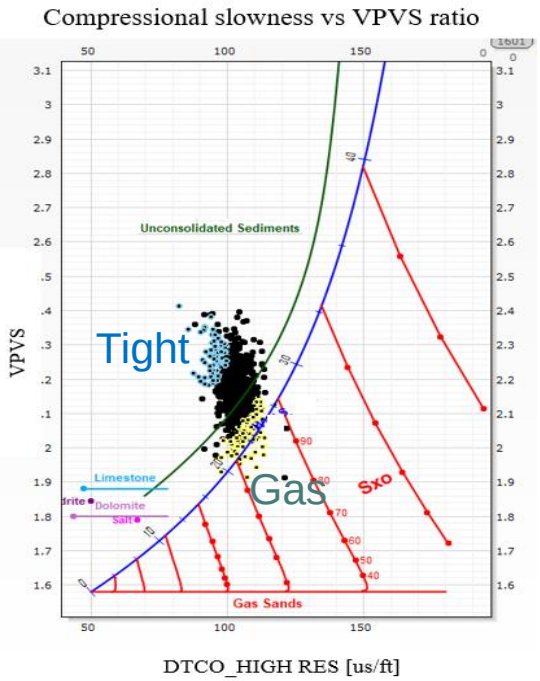




Application to Thin Bedded Formation Evaluation

- Good quality compressional and shear slowness provide critical inputs to geophysics and geomechanics.
- Novel higher resolution sonic helps unlocking gas bearing zones within the thin layers and better identify tight streaks and laminations with high degree of cementation.
- This is input to optimal fracturing design.





Summary

- A new method is developed to further enhance sonic log vertical resolution
  Apparent resolution < 1 ft
- The method fills the gap between conventional sonic processing and ultrasonic processing
- The method can be applied to QC conventional log to remove outlier automatically
- High resolution sonic can be used for different application, finetuning MEM for fracking of thin-beds reservoir to support operation decision

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