

Interpreting Cement Bond Logs

Kirk Harris



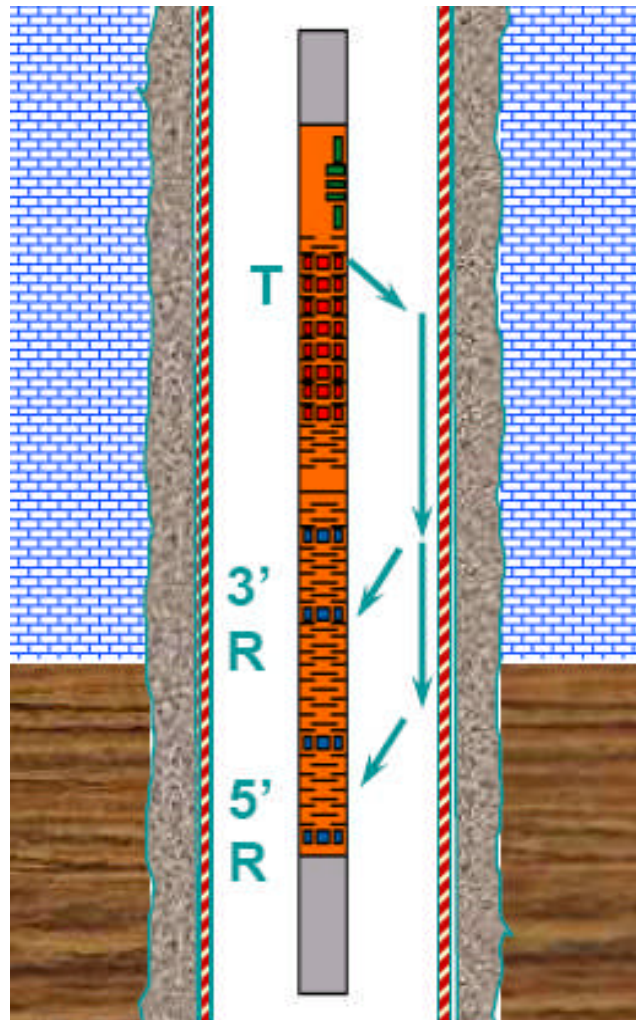
Cement Log Evaluation

- The Cement Bond Log
- The Radial Bond Log
- Ultrasonic Log
- Flexural Attenuation Log





Cement Bond Log (CBL)

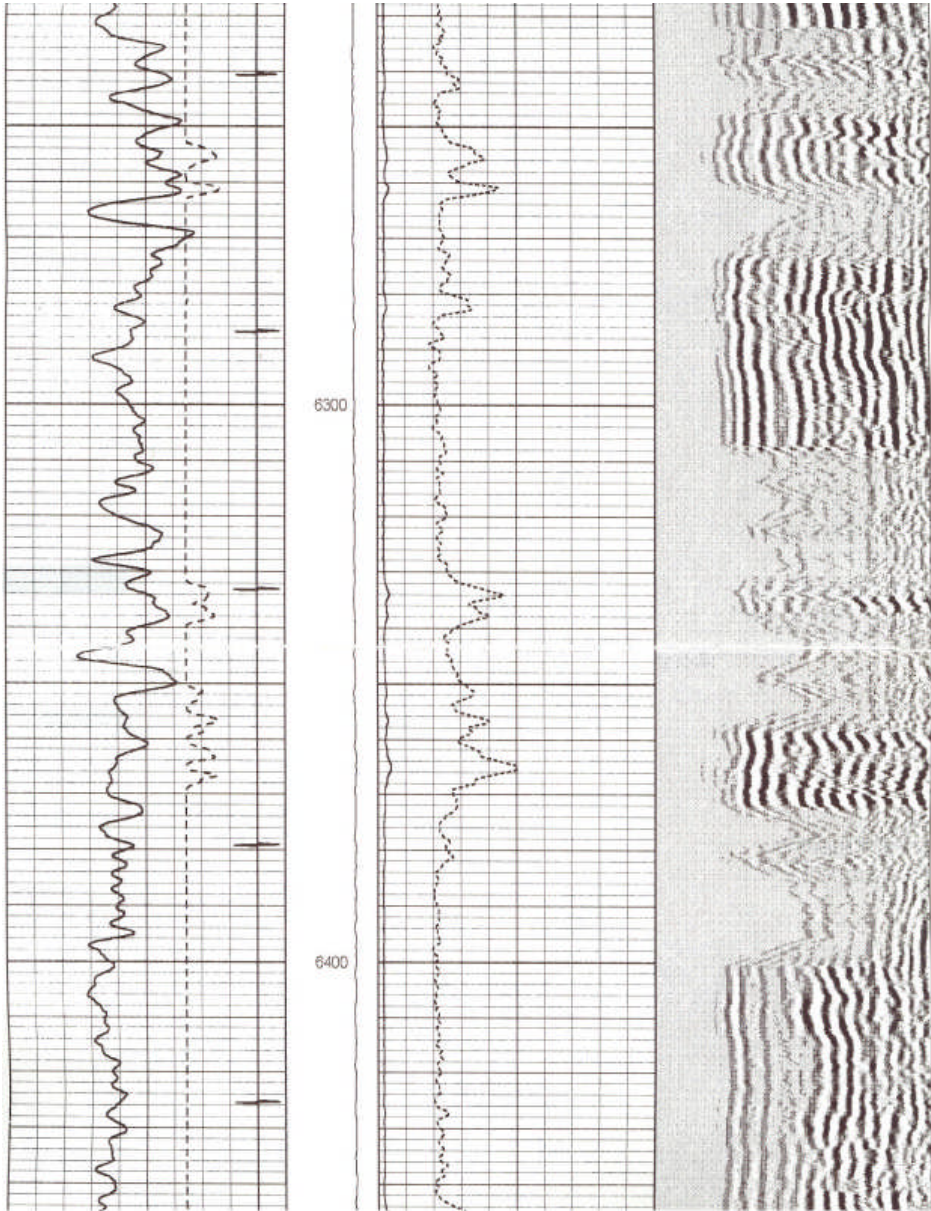








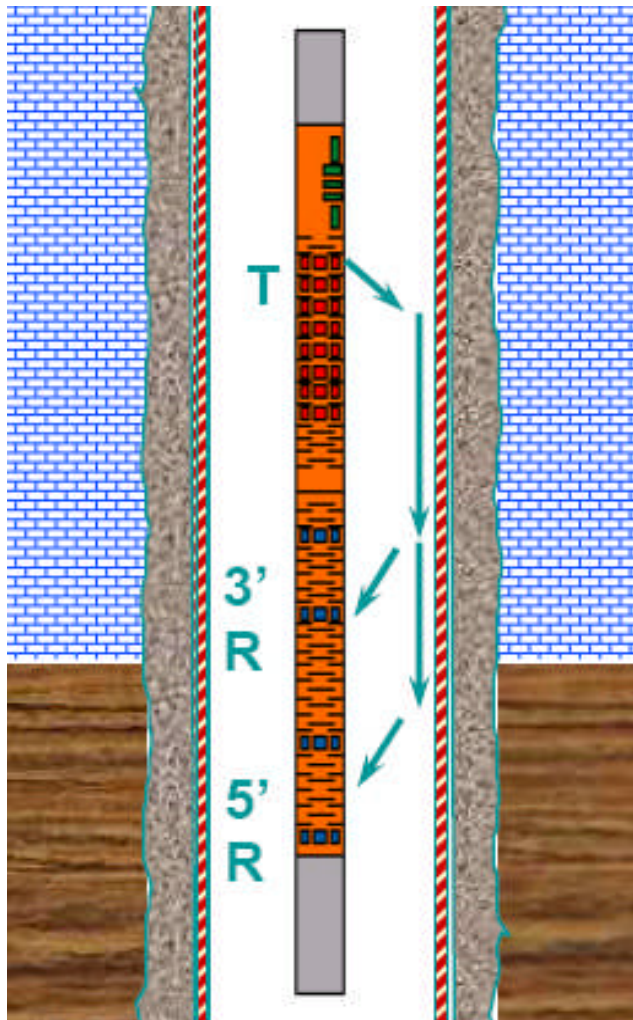
Cement Bond Log Presentation





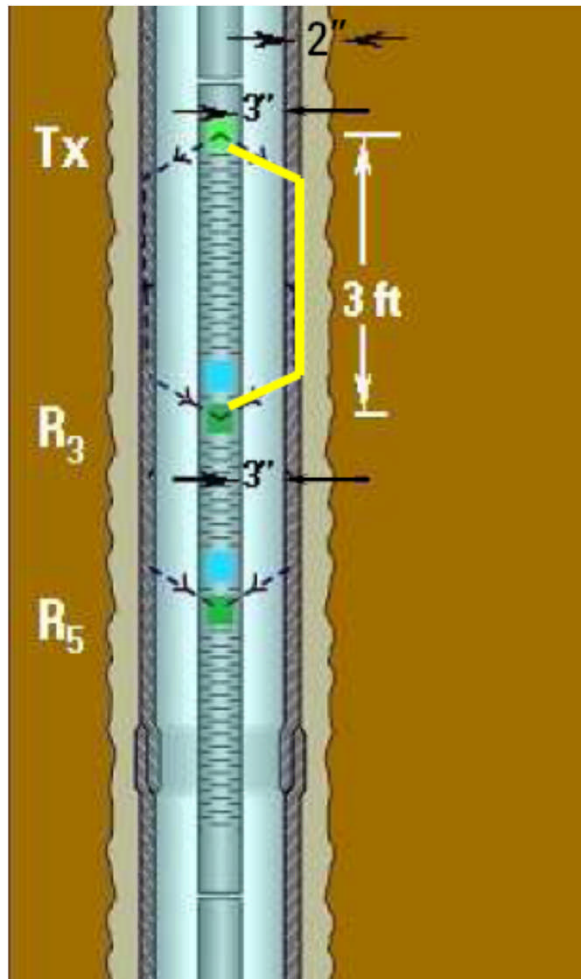


Cement Bond Log (CBL)

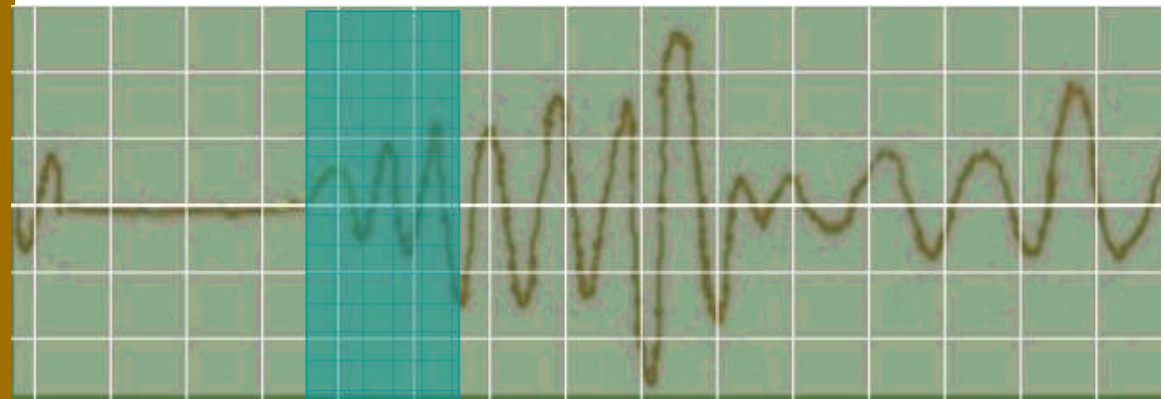




Sound Wave Travel Path

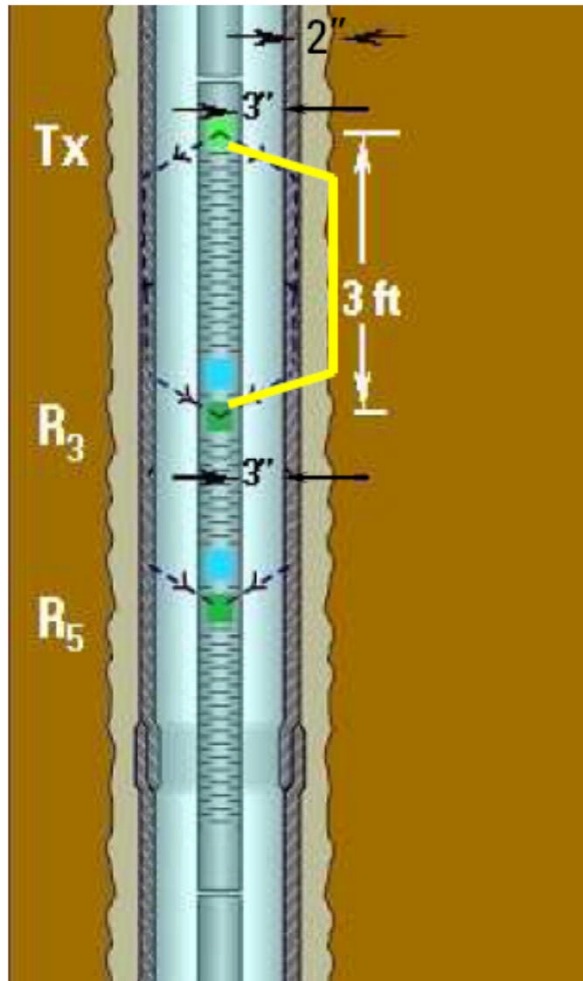


Through Casing

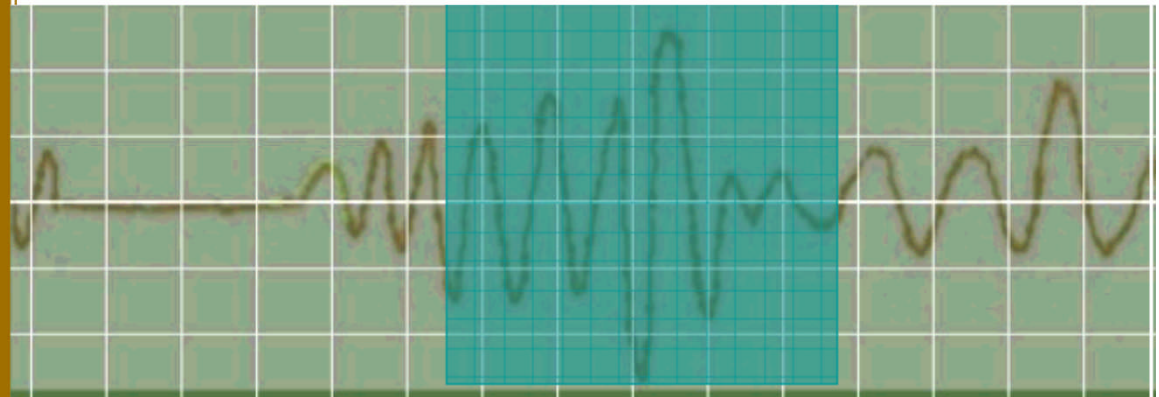




Sound Wave Travel Path

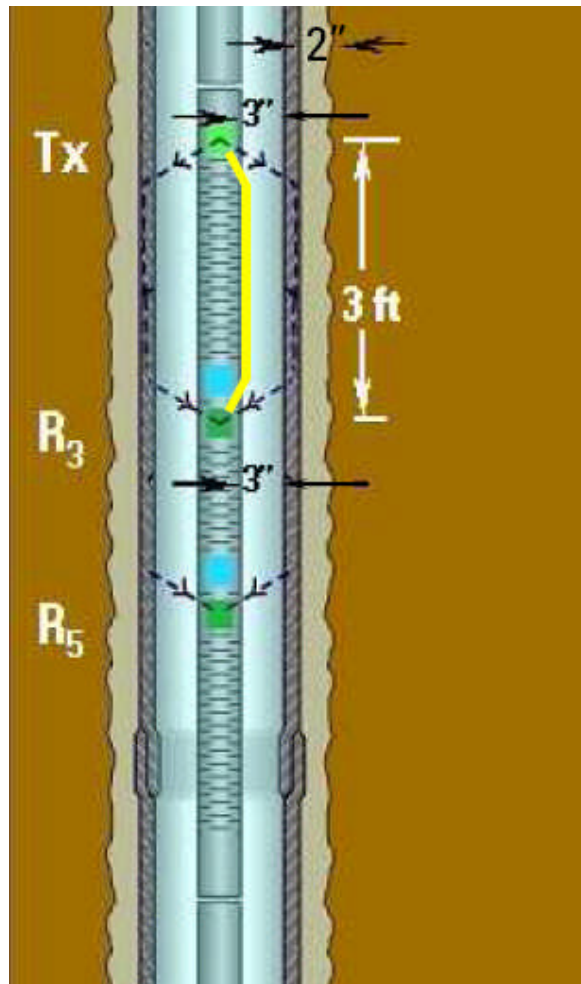


Through Cement / Formation

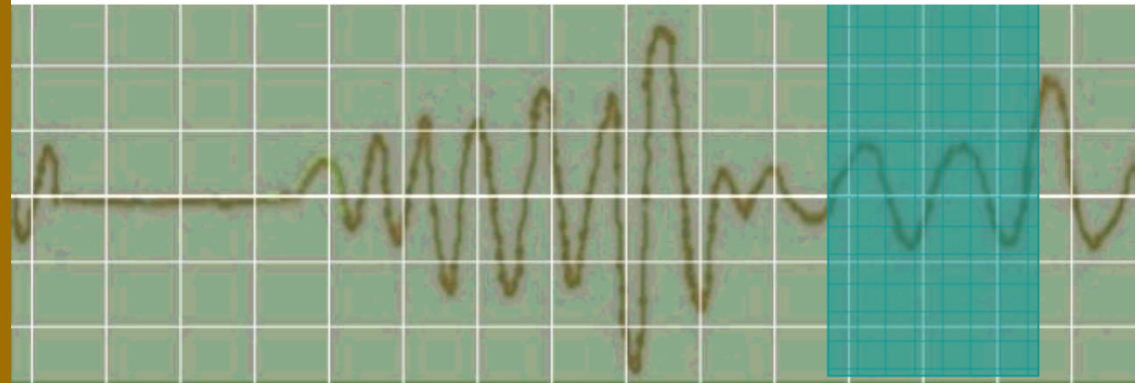


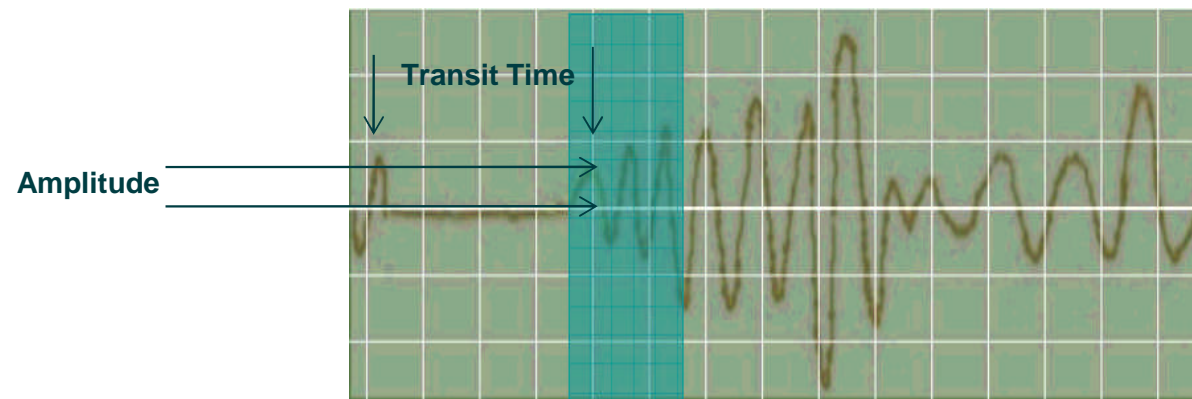
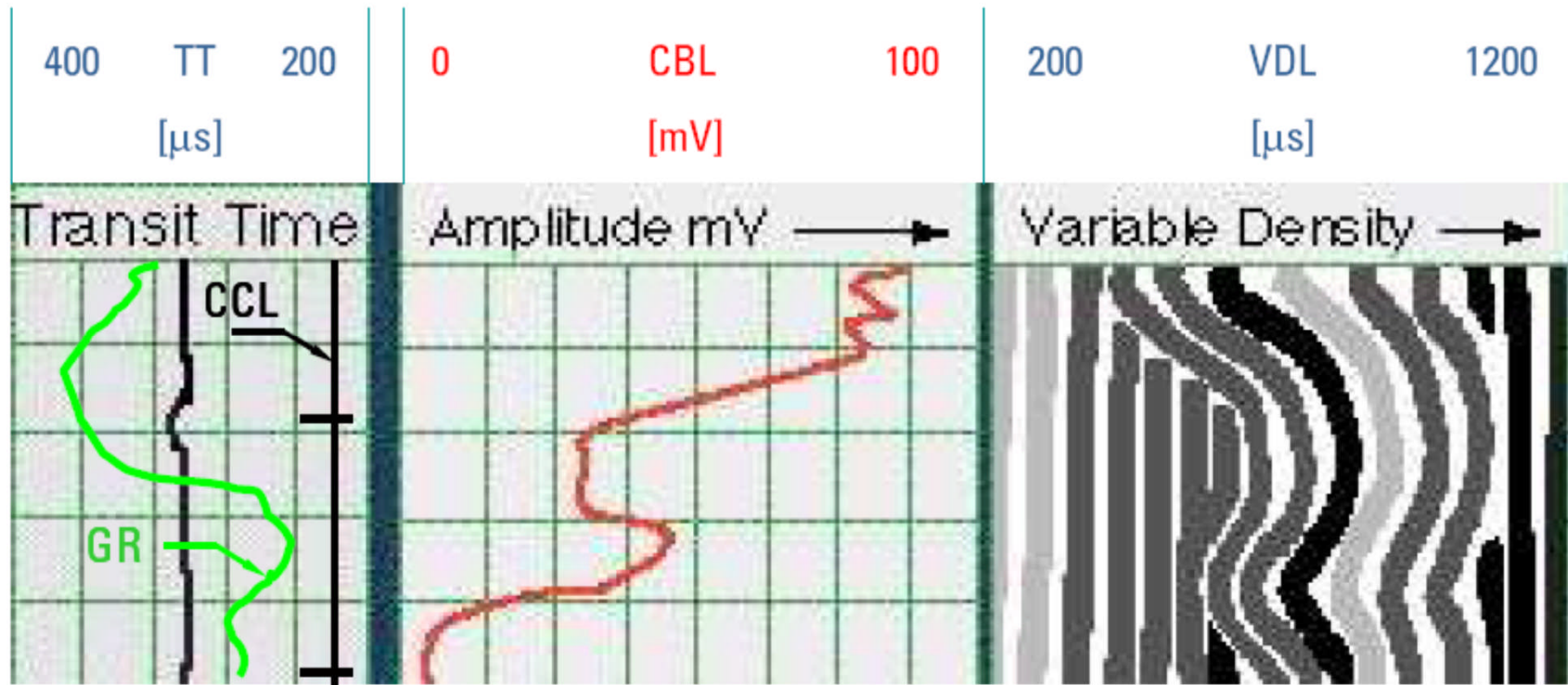


Sound Wave Travel Path

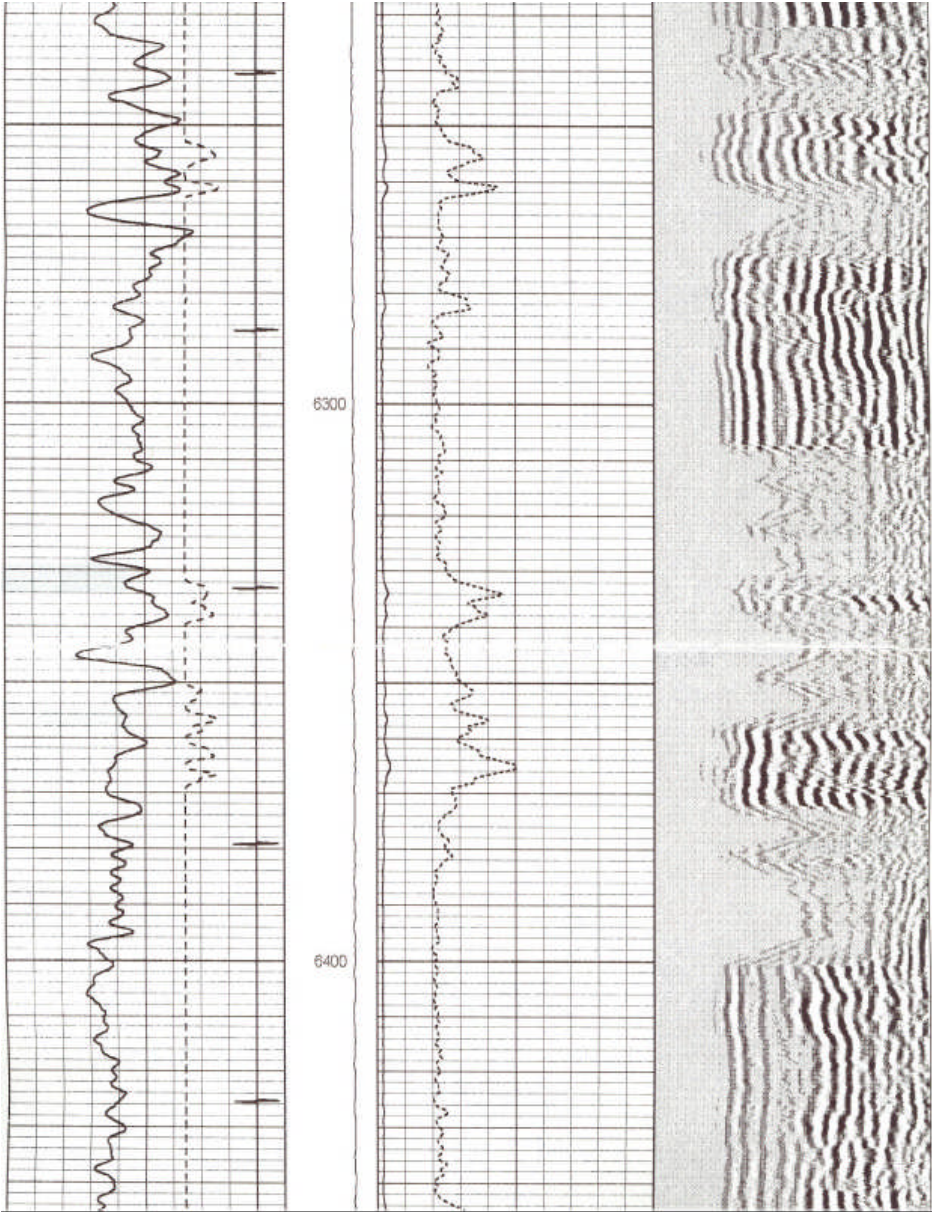


Through Casing Fluid





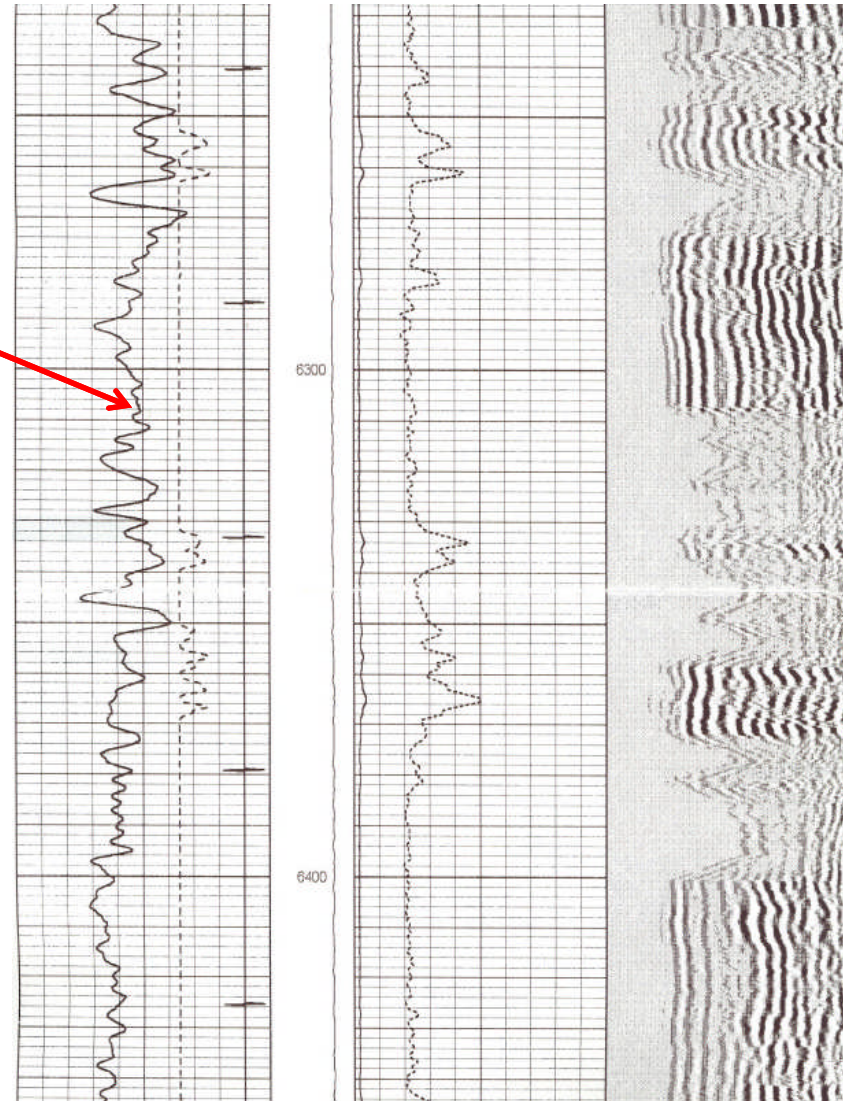
CBL



CBL



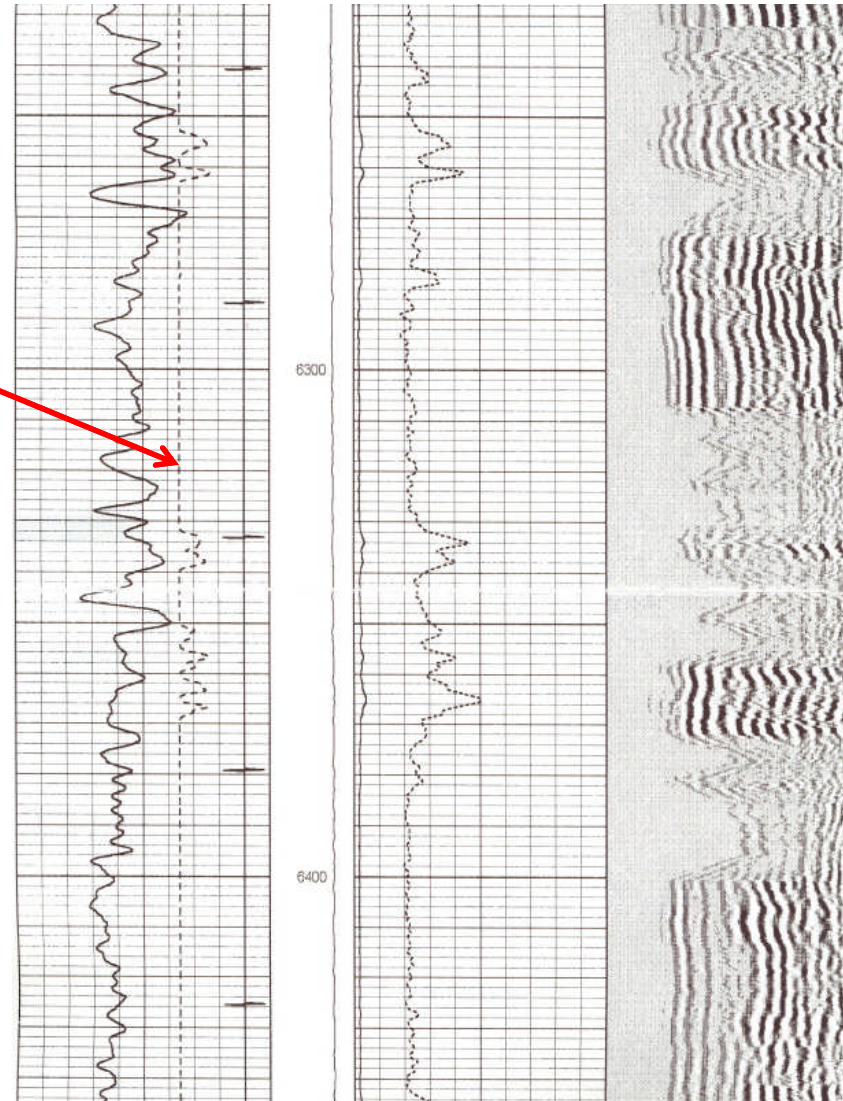
Gamma



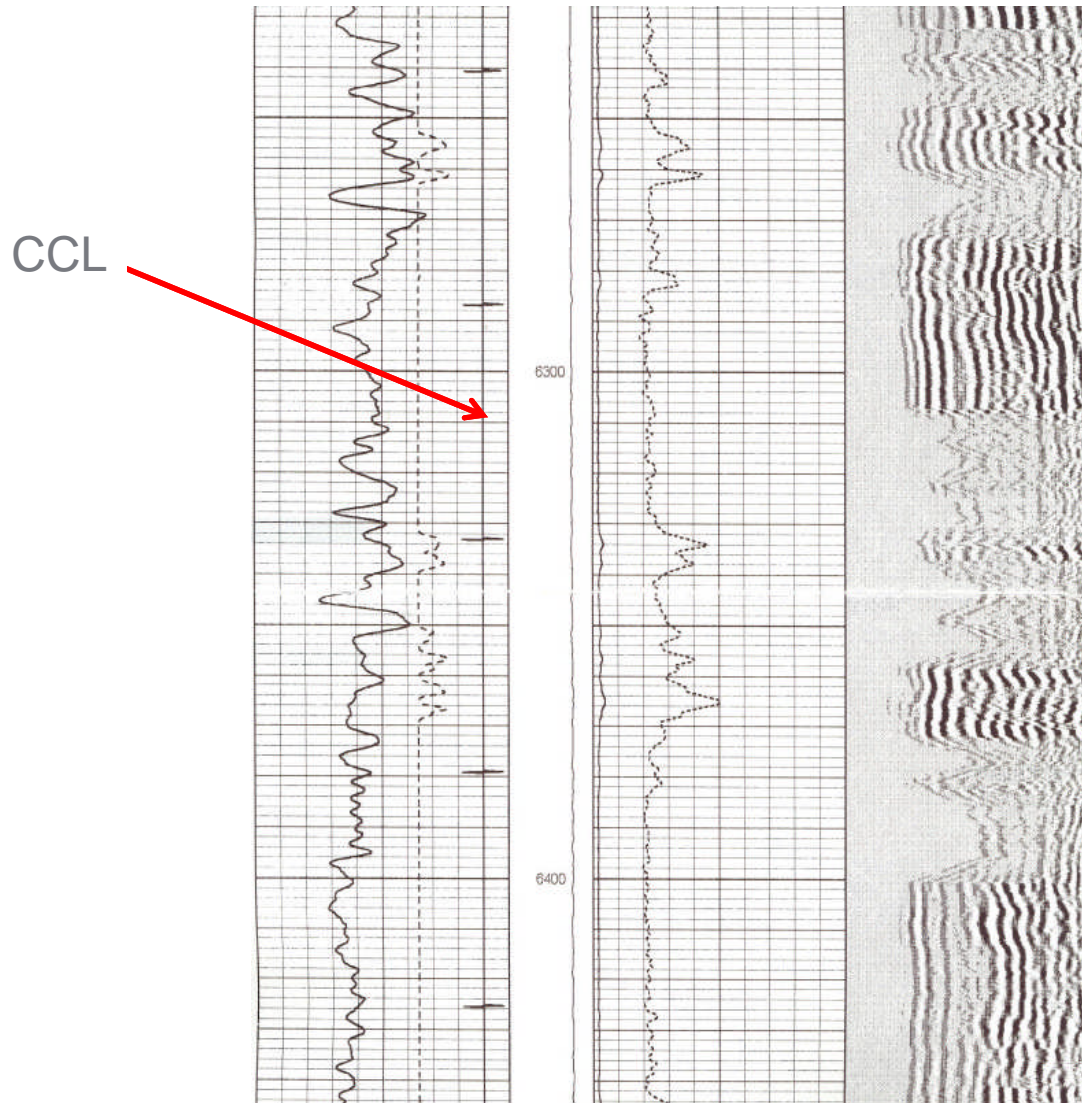
CBL



Transit
Time



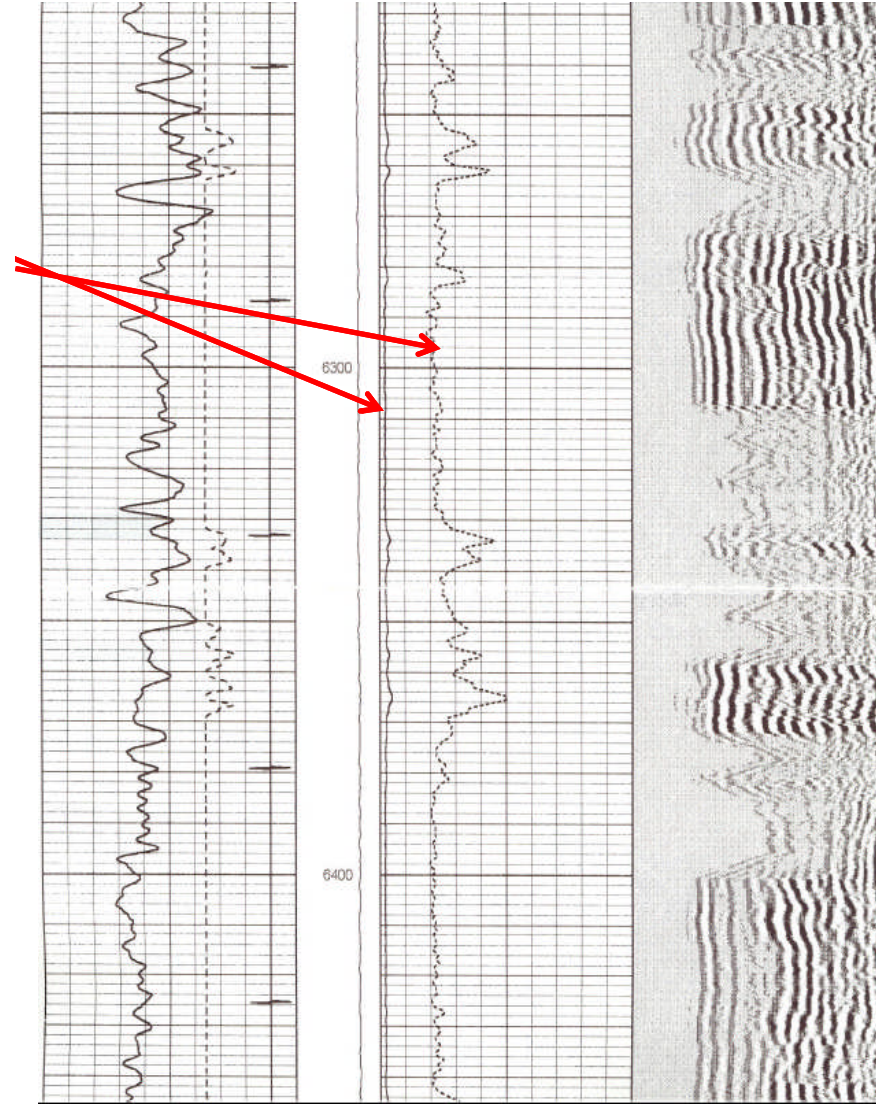
CBL



CBL



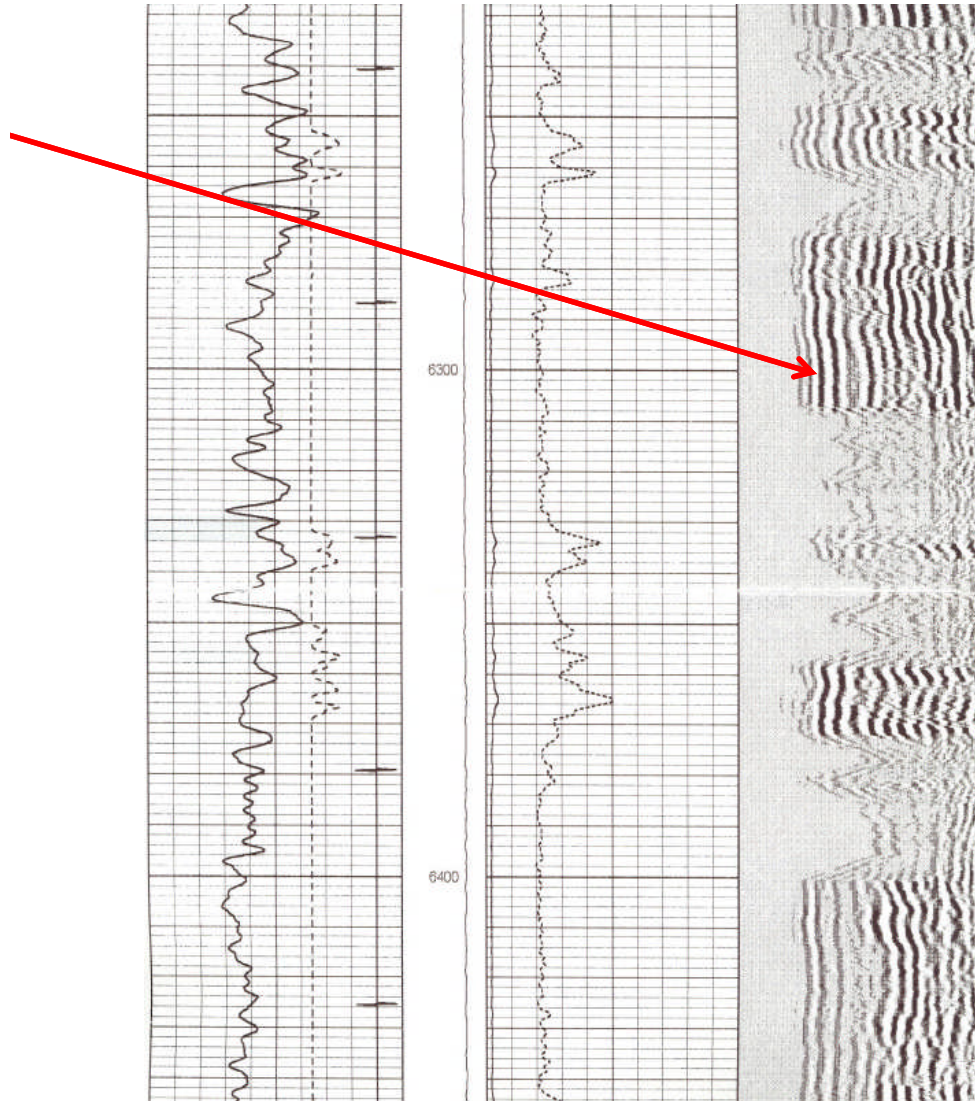
Amplitude



Bond Log



MSG
or VDL

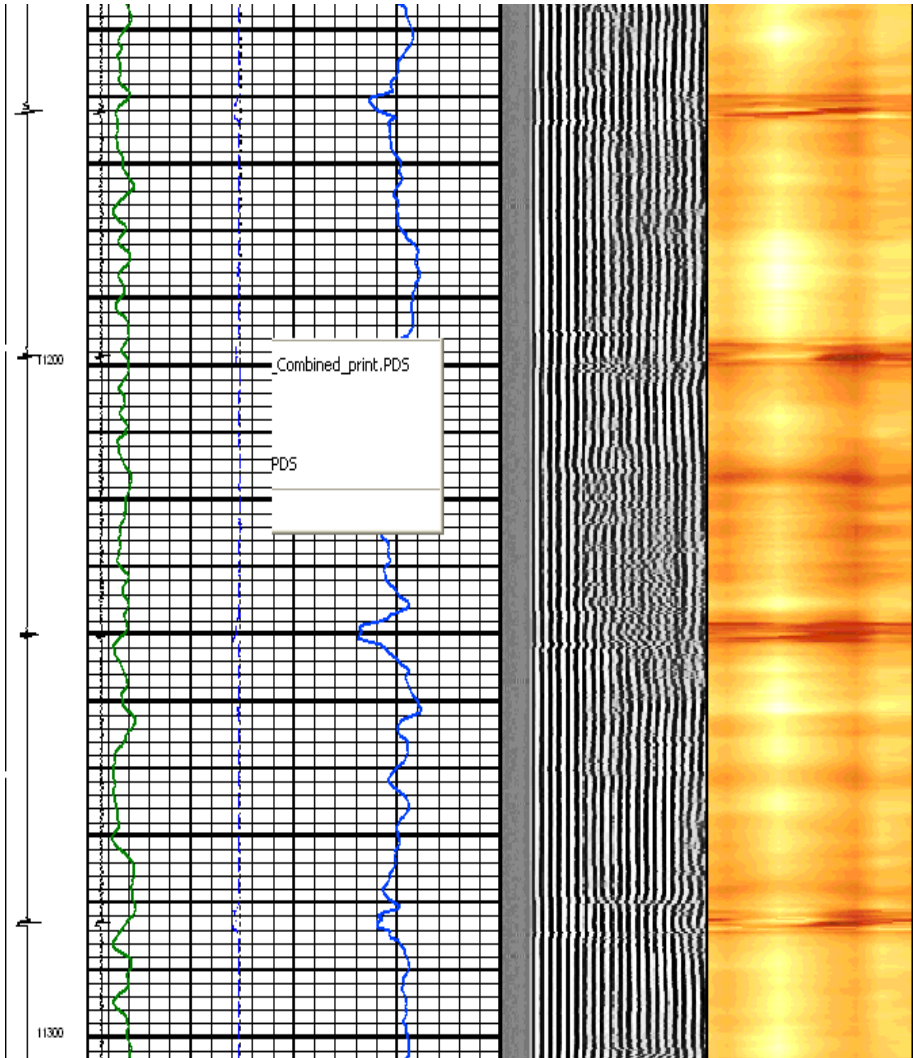


“Directional” Sonic Log



- Segmented Bond Log
- Radial Bond Log

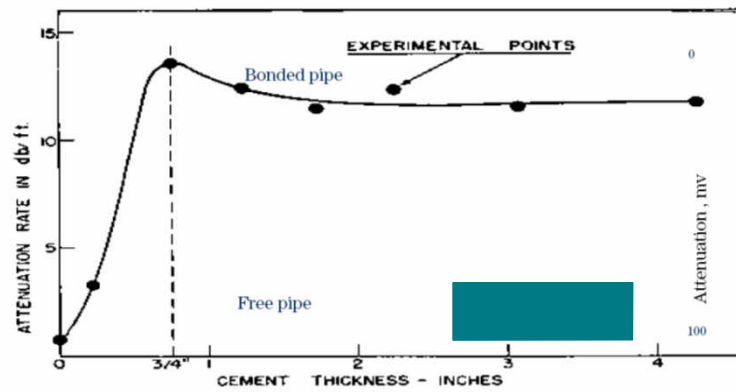
Directional Sonic Log



Directional Sonic Log

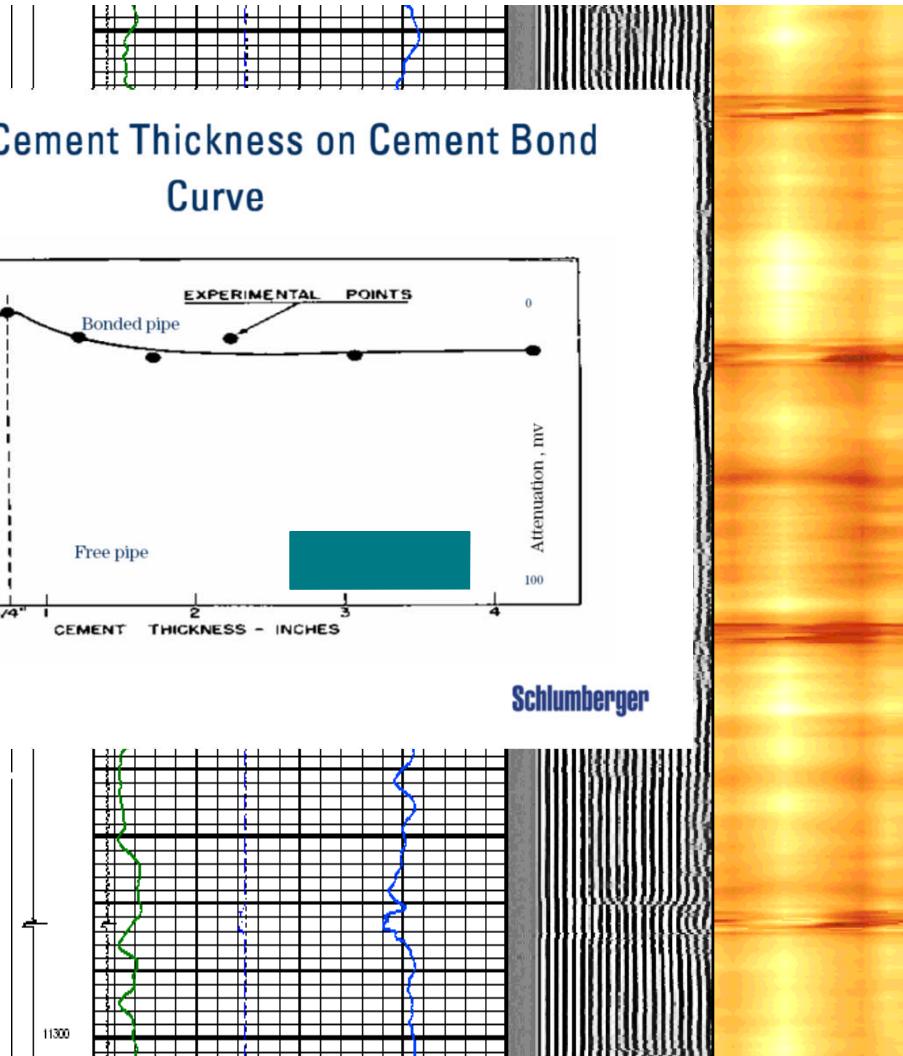


Effect of Cement Thickness on Cement Bond Curve



13-Nov-2008 31

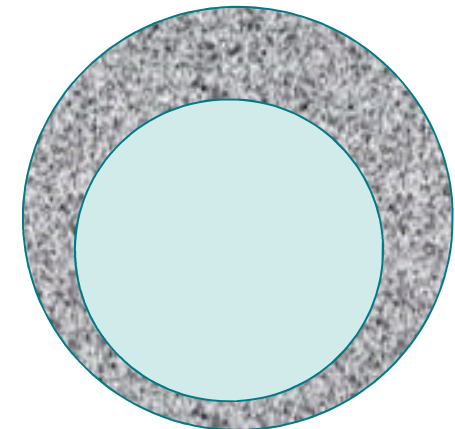
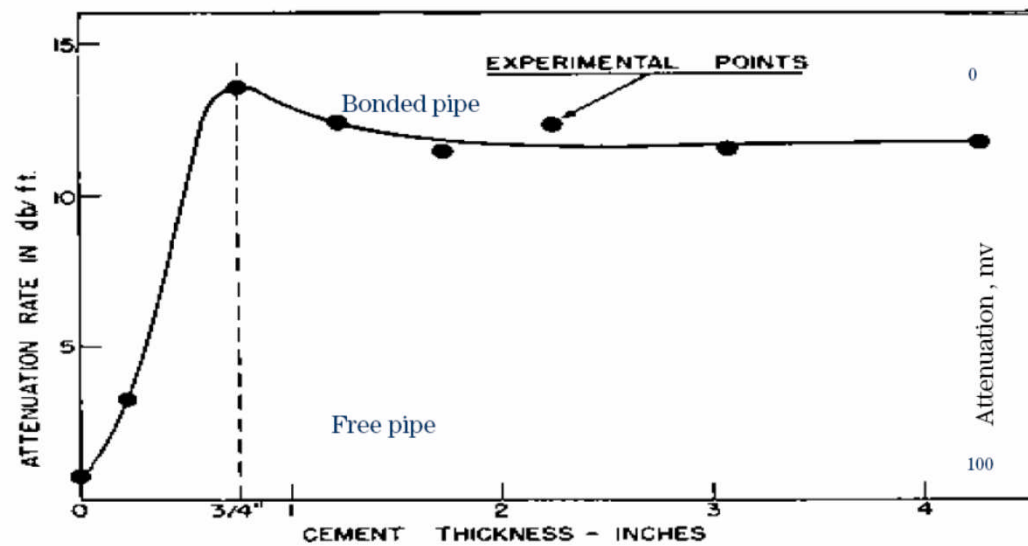
Schlumberger



Directional Sonic Log



Effect of Cement Thickness on Cement Bond Curve



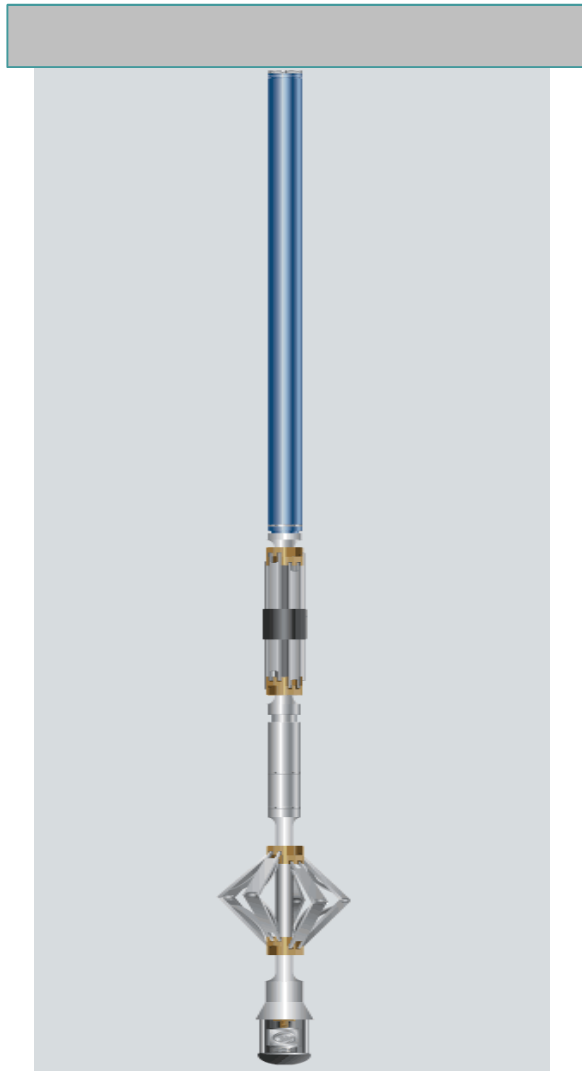




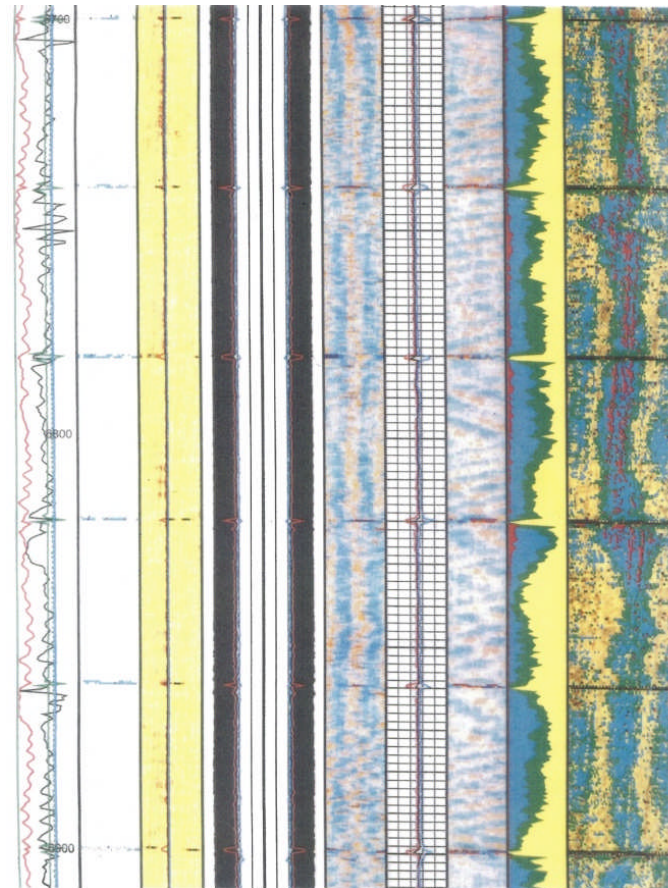
What is the Purpose of an Ultrasonic Log ?



Ultrasonic Log



- Directional – 7.5 rps
- 5 – 10 degree “pings”
- Casing and Cement Map





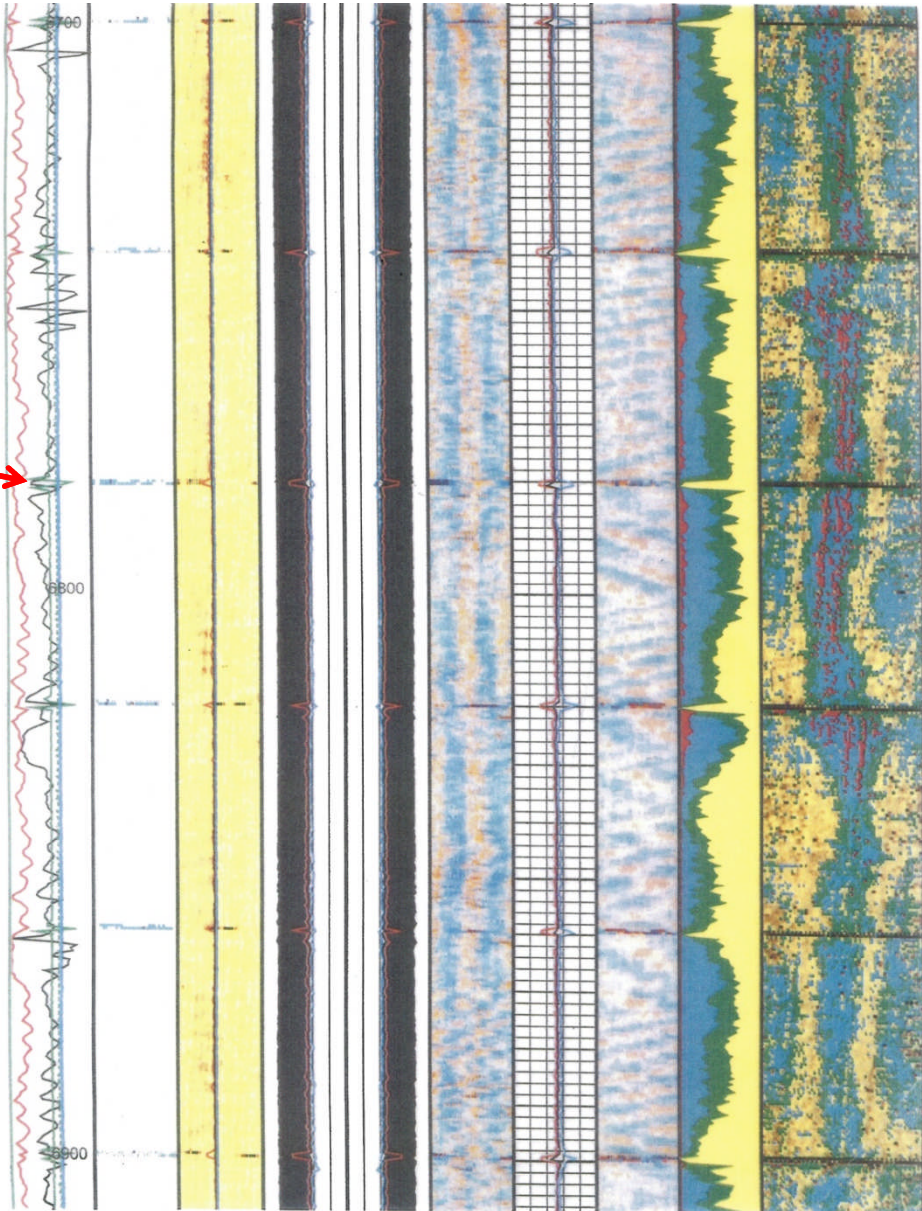




Ultrasonic



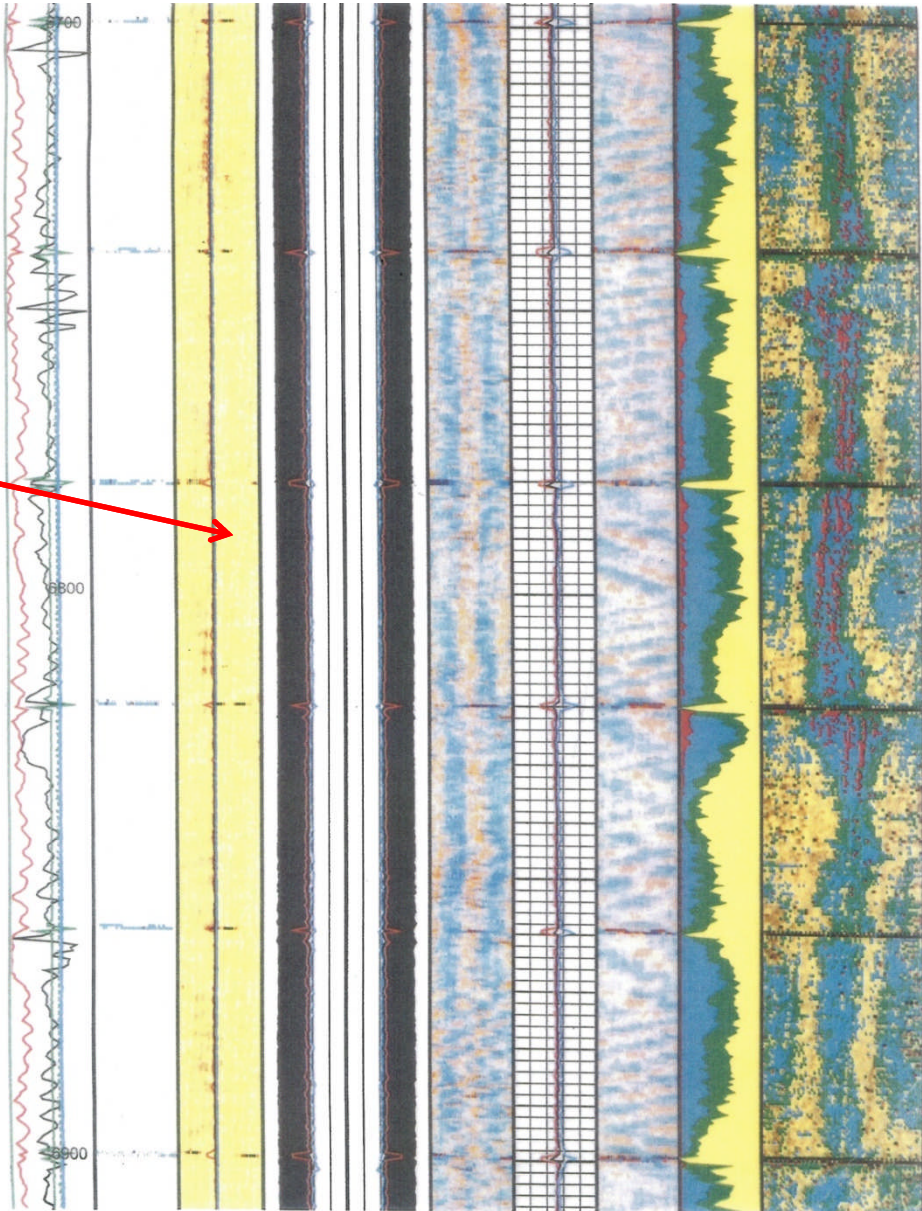
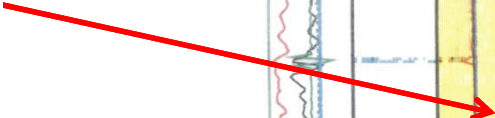
Eccentricity



Ultrasonic



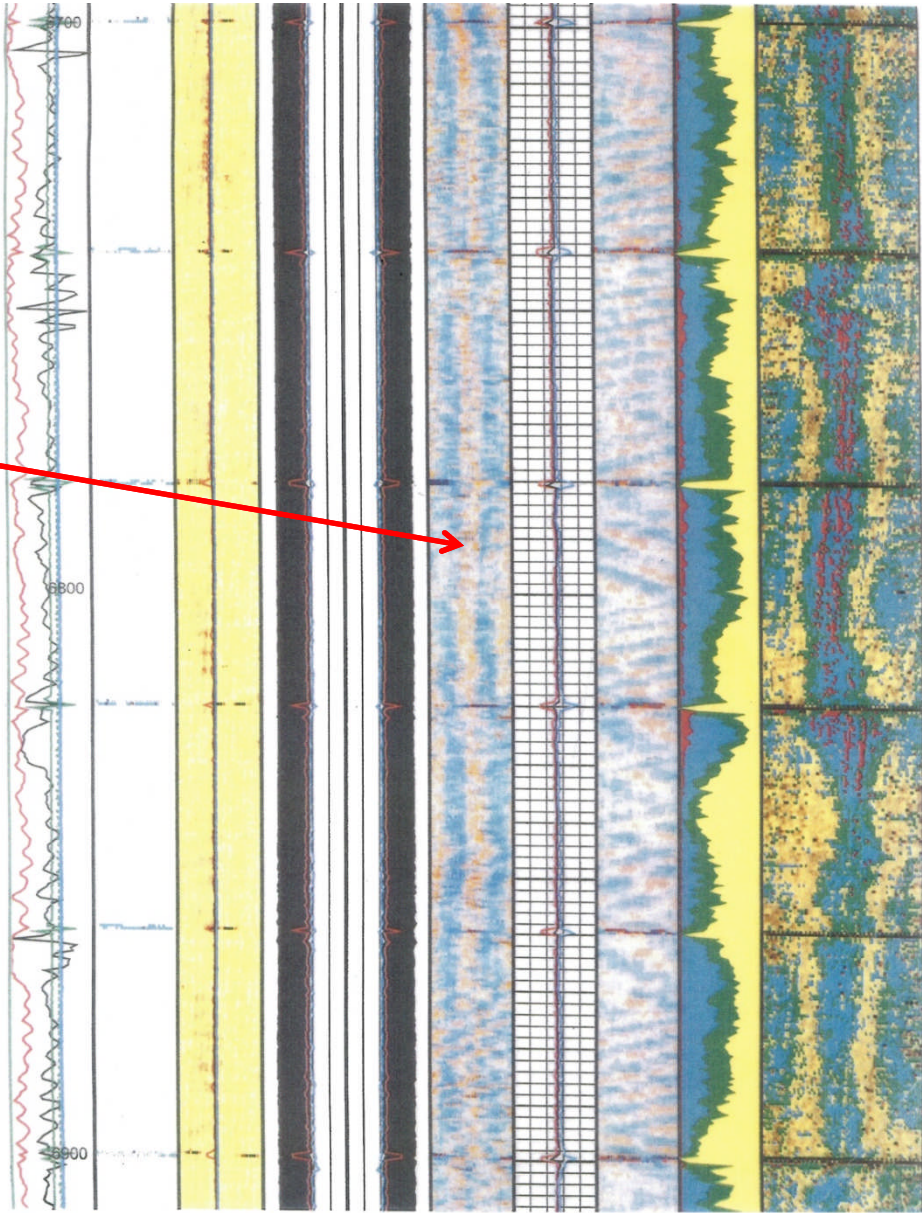
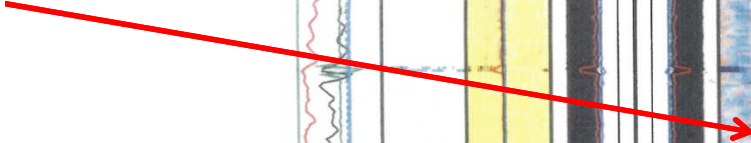
Amplitude



Ultrasonic



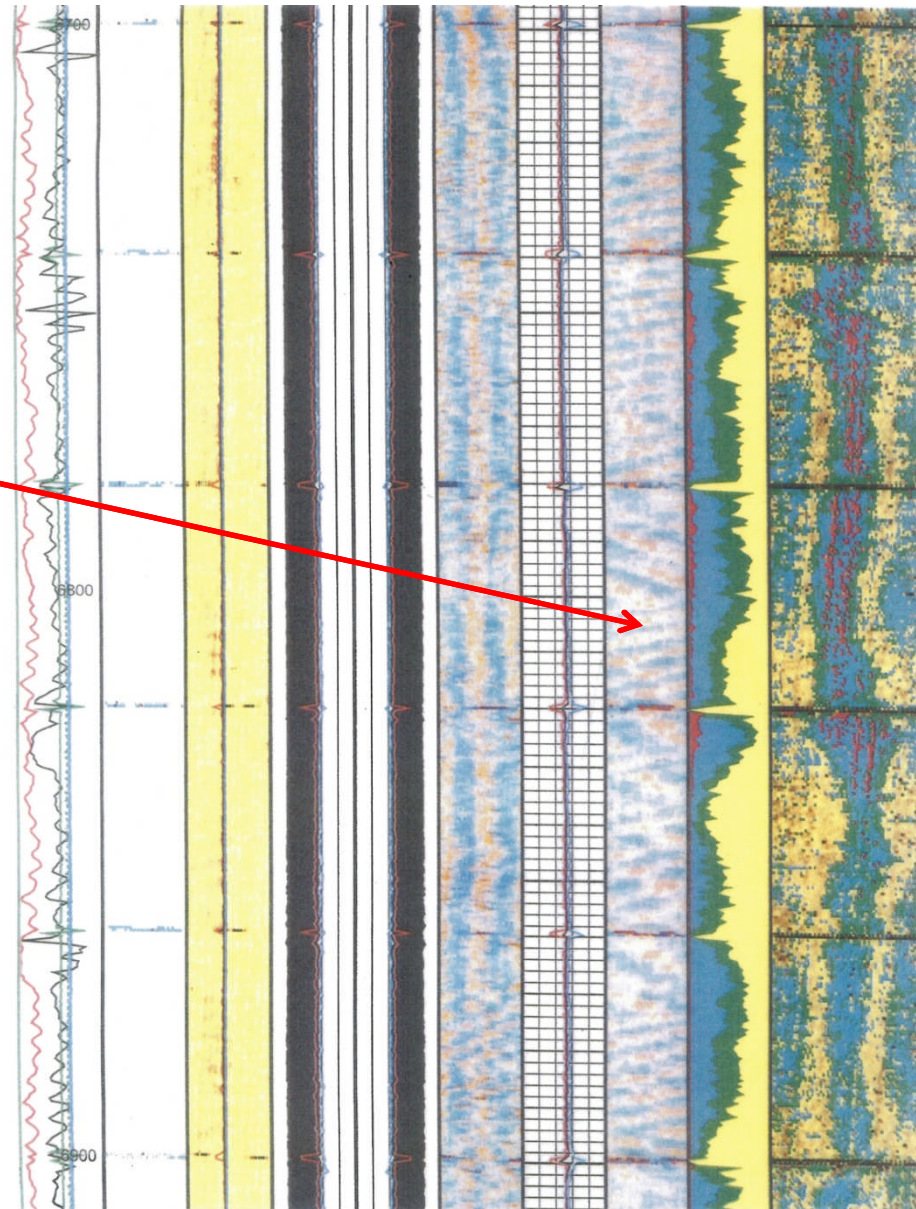
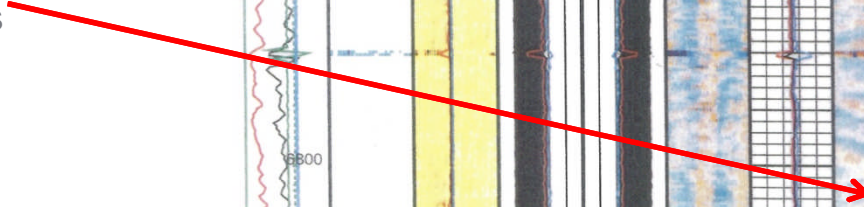
Casing
Radius



Ultrasonic



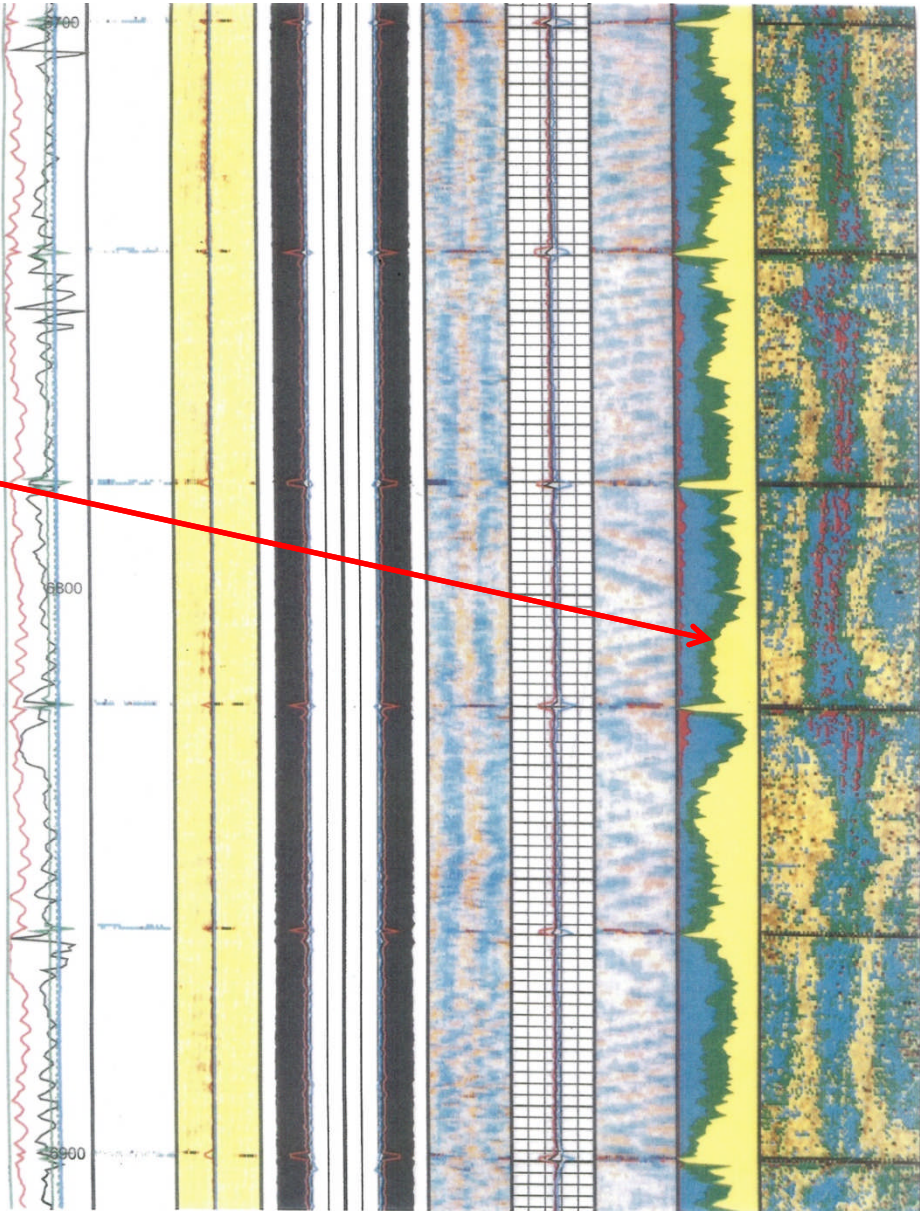
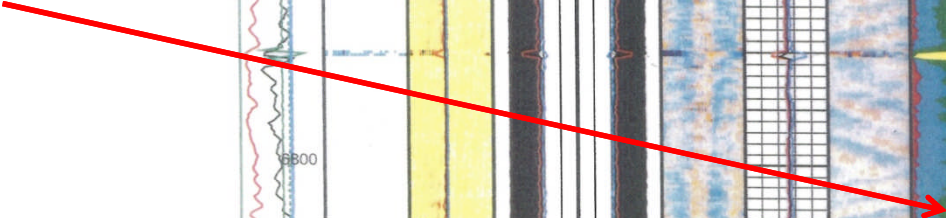
Casing
Thickness



Ultrasonic



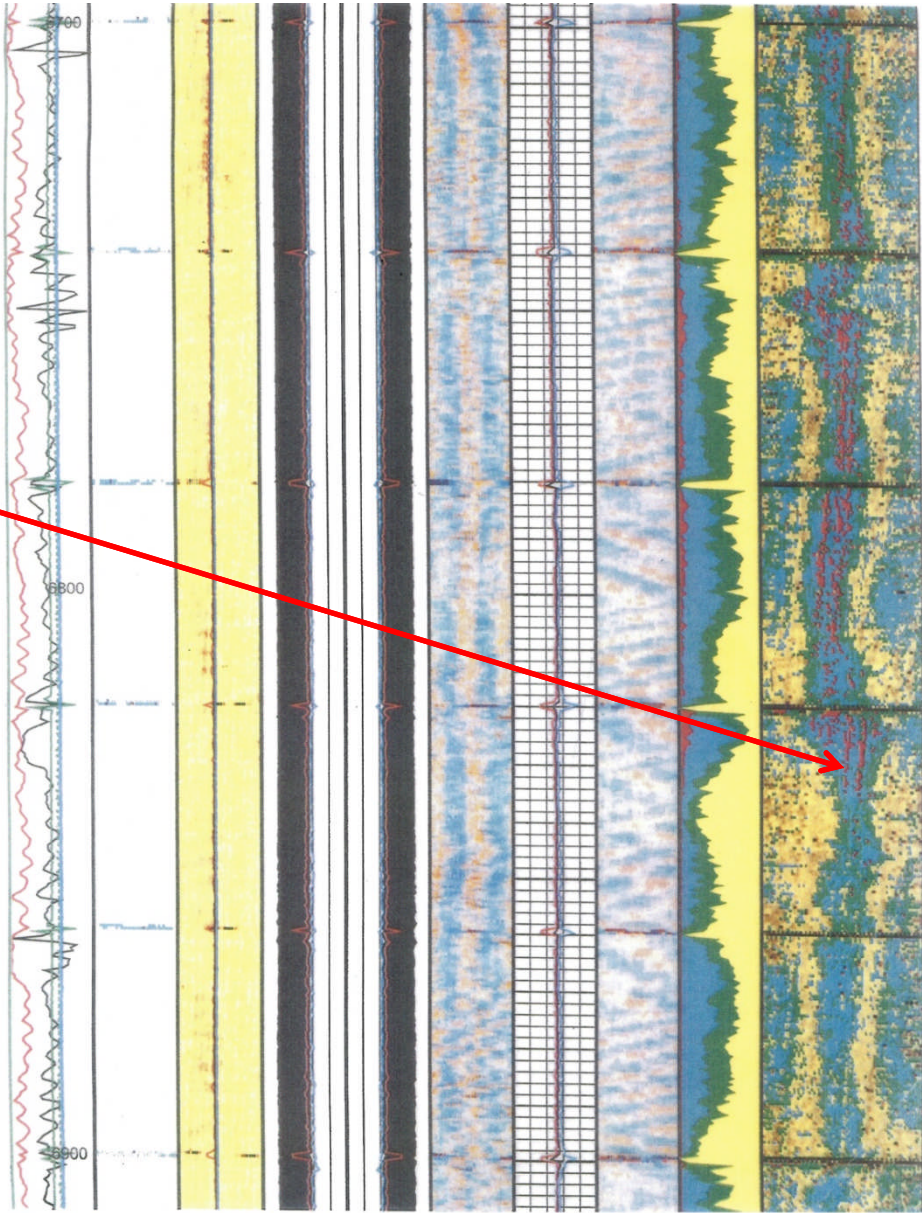
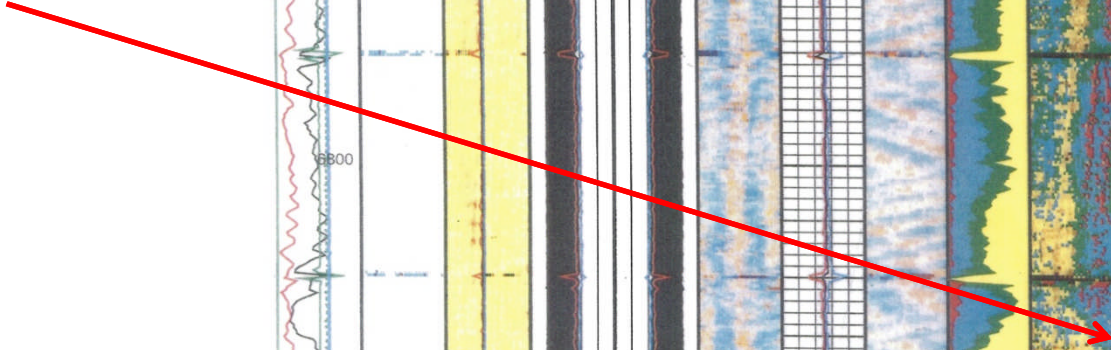
Bond Index



Ultrasonic

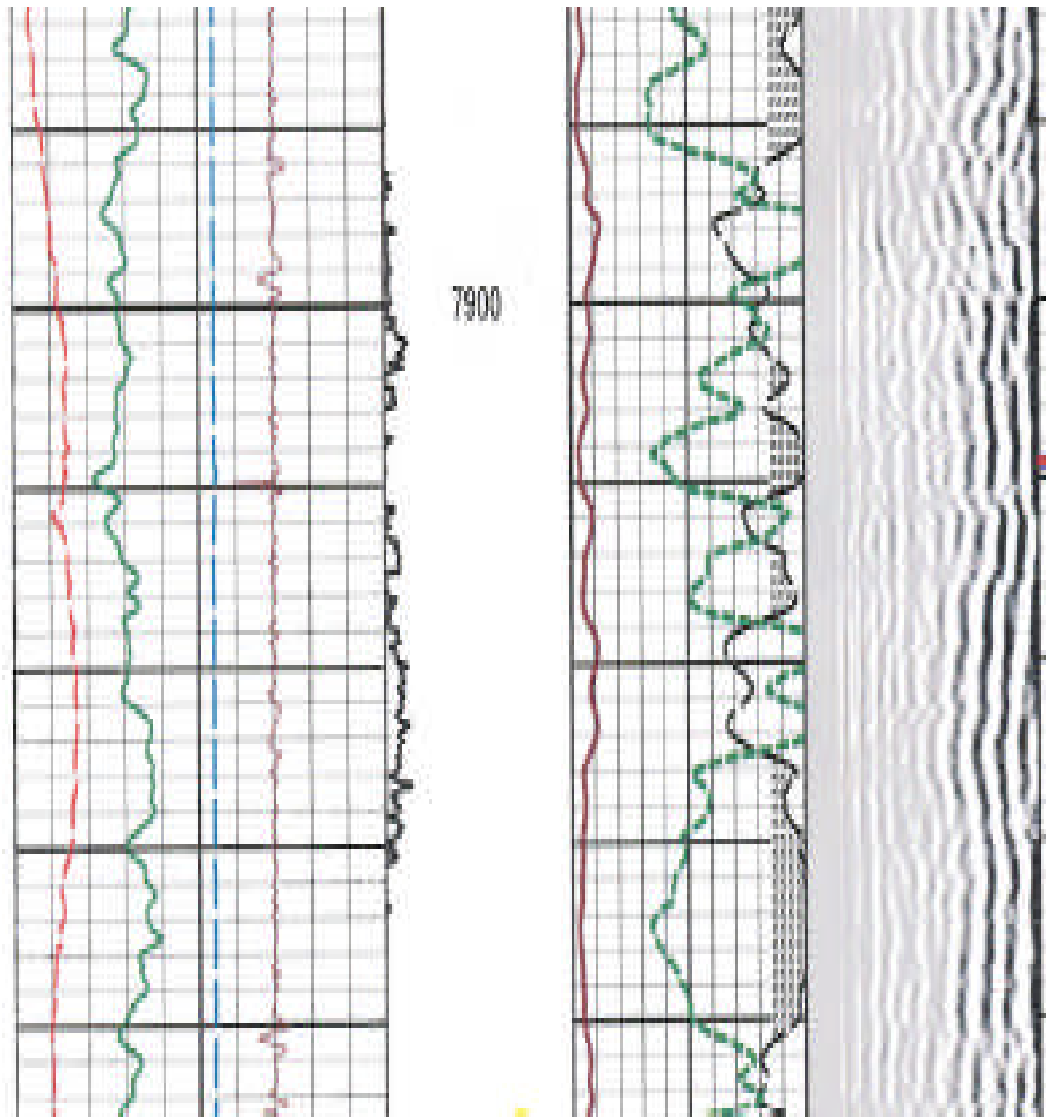


Impedance

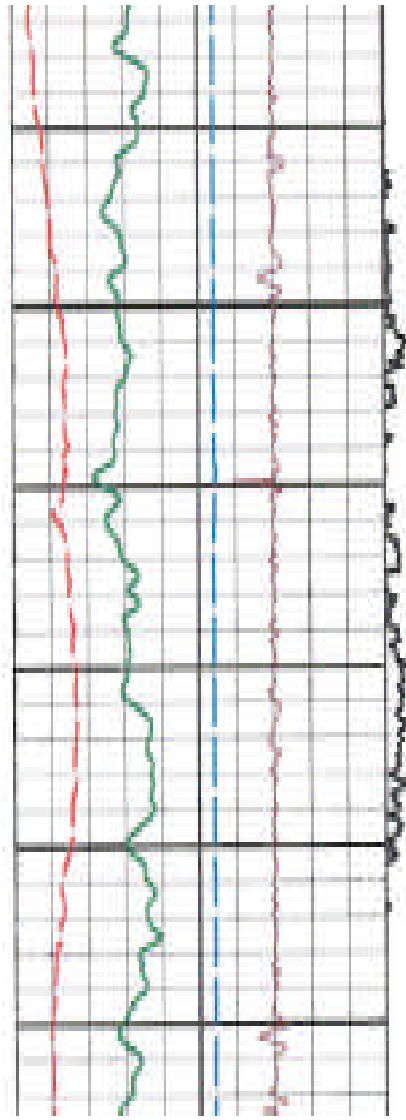




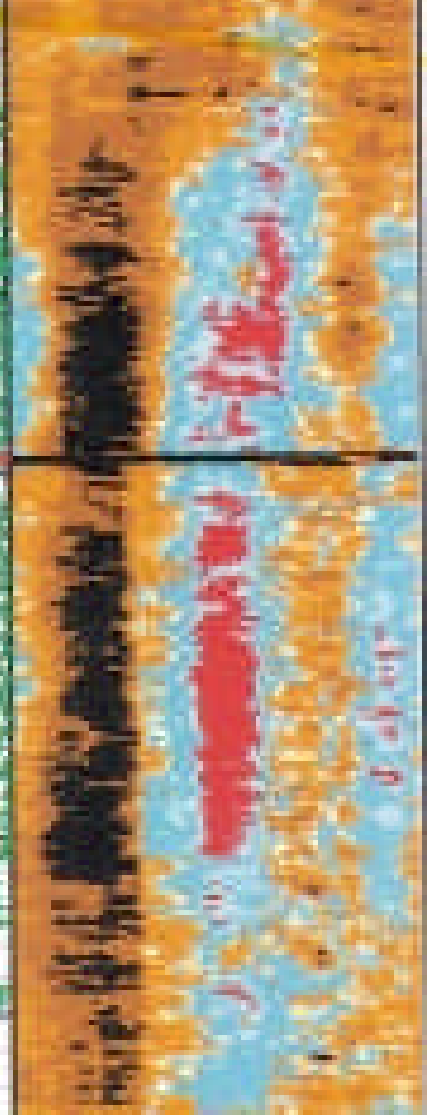
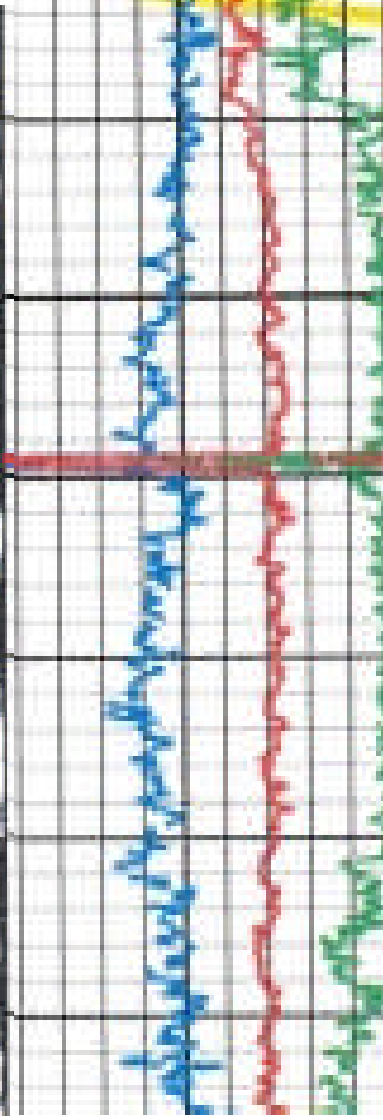
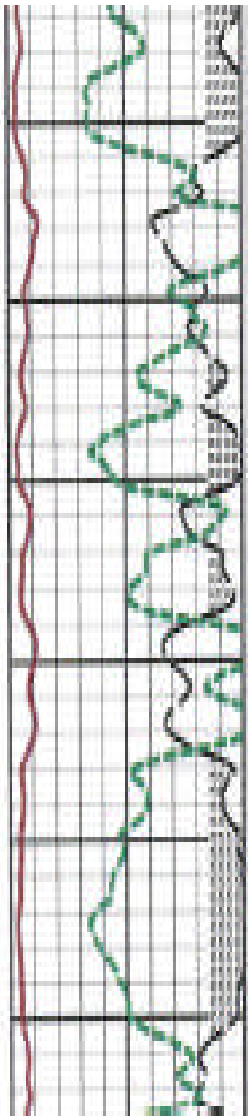
Ultrasonic Logs Are Good



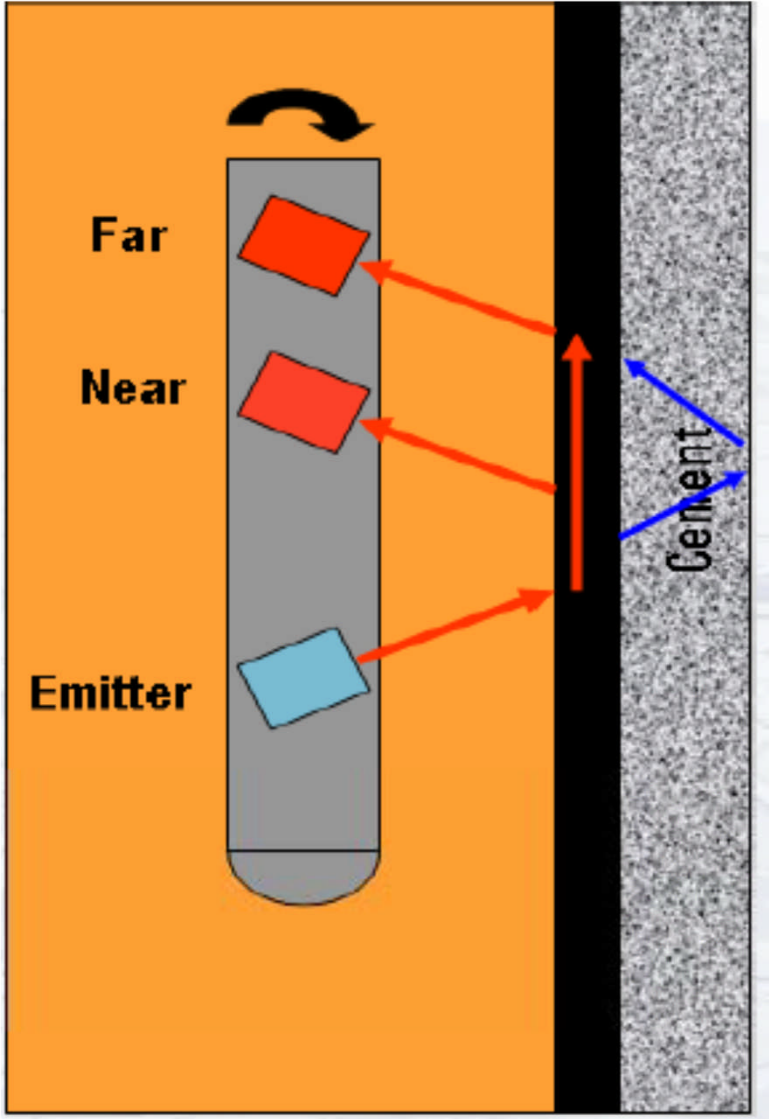
Zonal Isolation



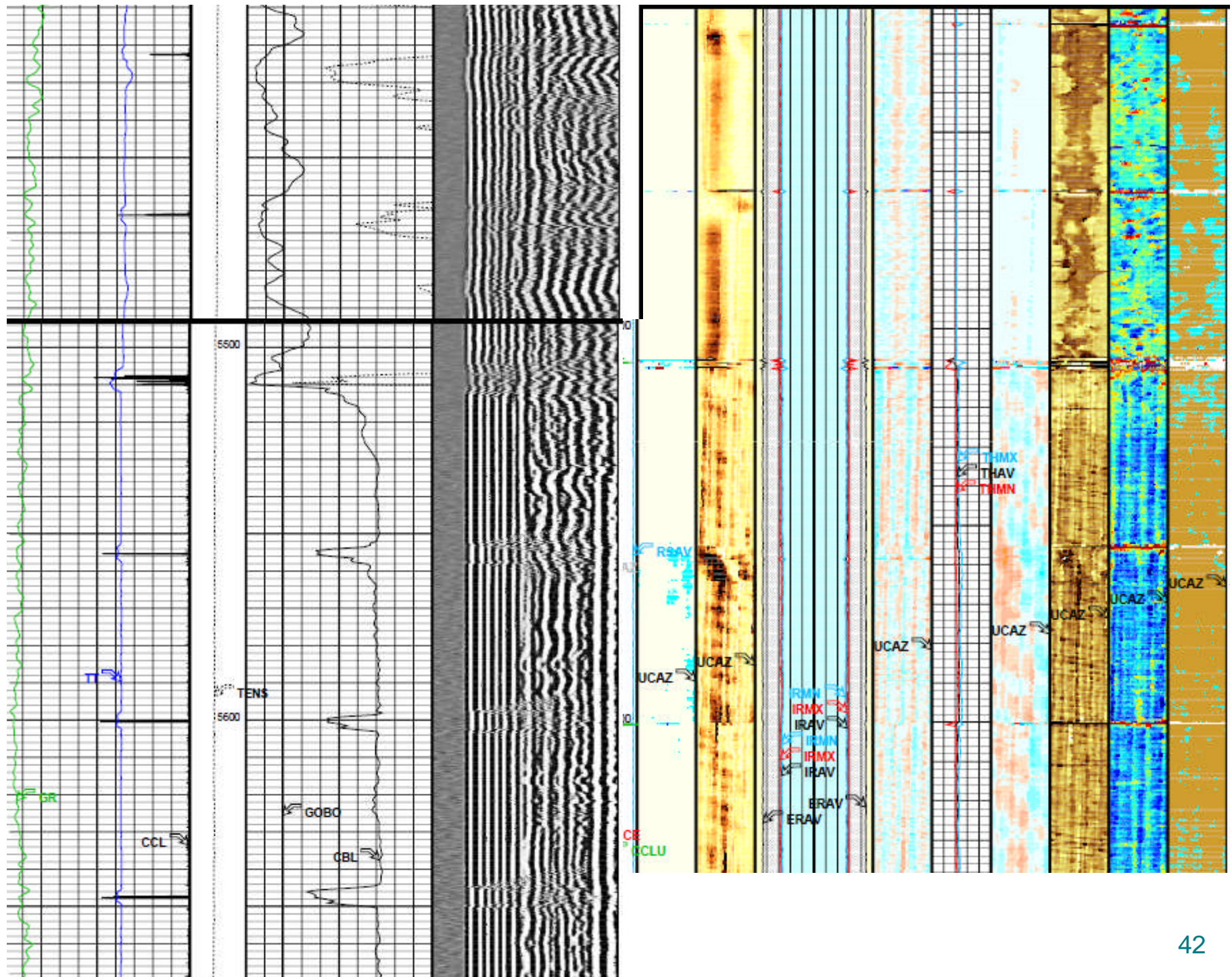
7900



Isolation Scanner



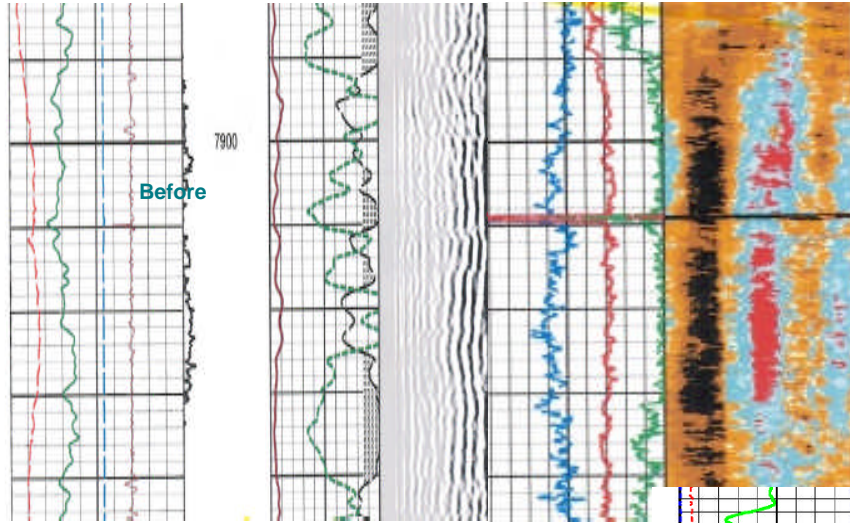






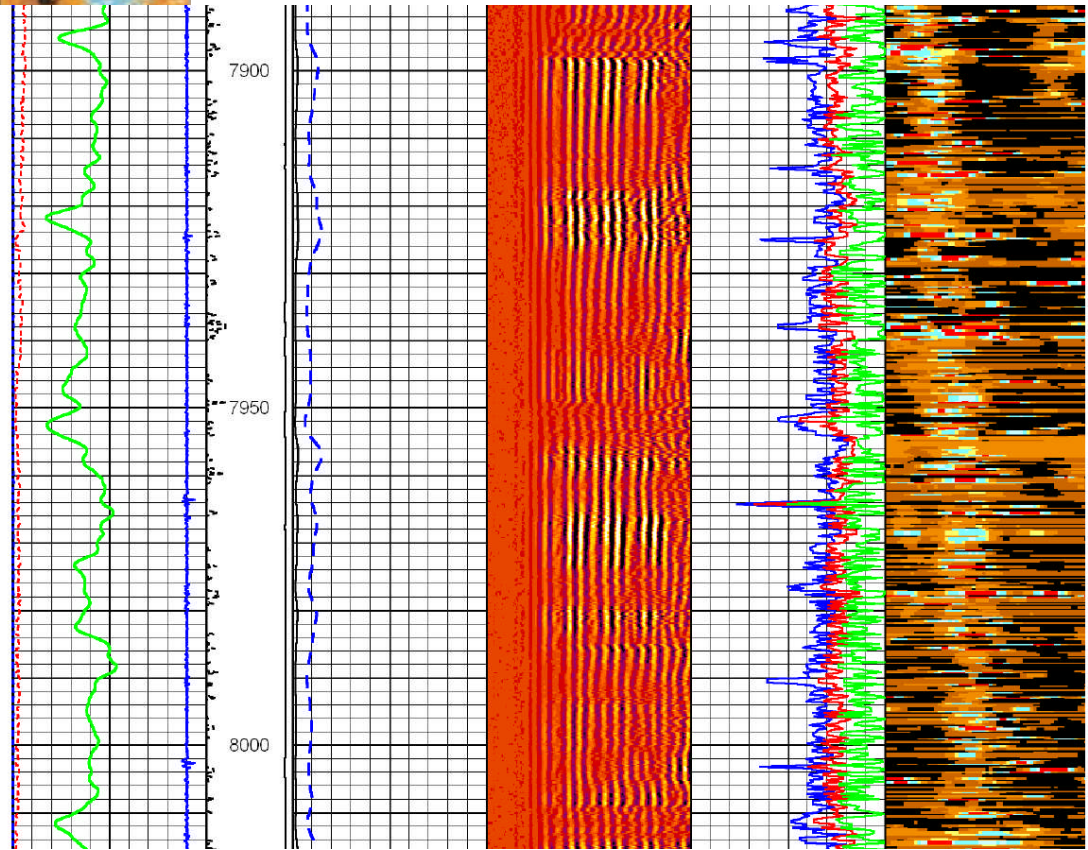
Cement Log Interpretation

- Hang Log On Wall
- Quality Control Checks
- Observe
- Investigate Shear Bond
- Reason - Cement & Formation
- Interpret



Before
←

After
→



Summary



- Cement Evaluation Tools Are Simple
- Cement Evaluation Tools Are Very Useful
- Cement Evaluation Tools Have Limitations
- Therefore, Cement Evaluation Logs Are Confusing
- Comprehensive Bond Log Interpretation Yields Better Cementing
- Operators Should Discuss Bond Logs – And Should Know How to Interpret Bond Logs