

**EPIC Online Technology Meeting on Photonics Sensors for
Safer and Intelligent Oil & Gas Producers**



DFO intervention

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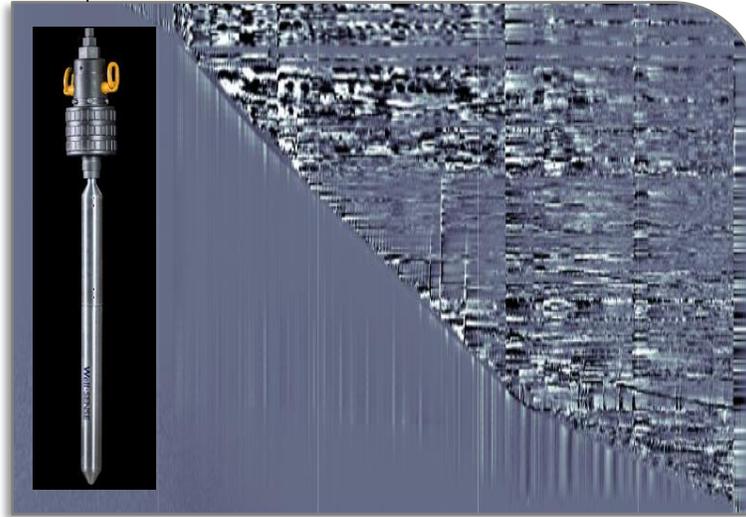
22 Mar 2021

Ziebel DFO intervention: deployment methods



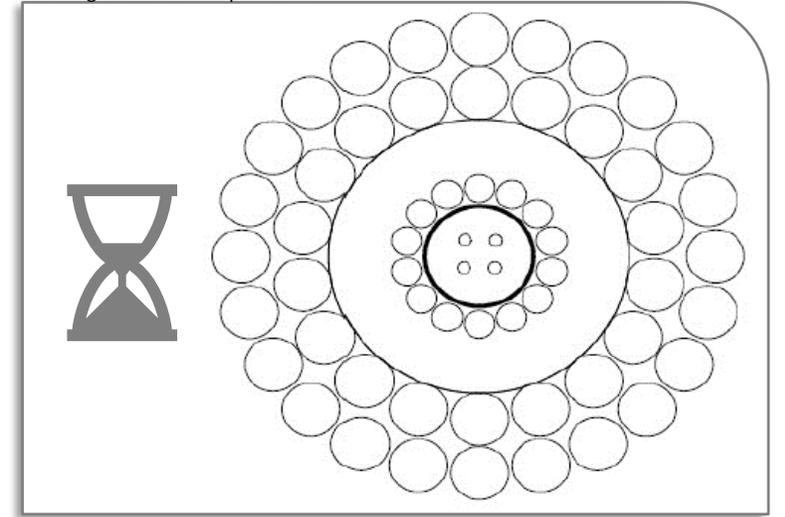
Z-System®:
Carbon rod
Electrified carbon rod

FLI tool picture from well-sense.co.uk



Well-SENSE FLI®

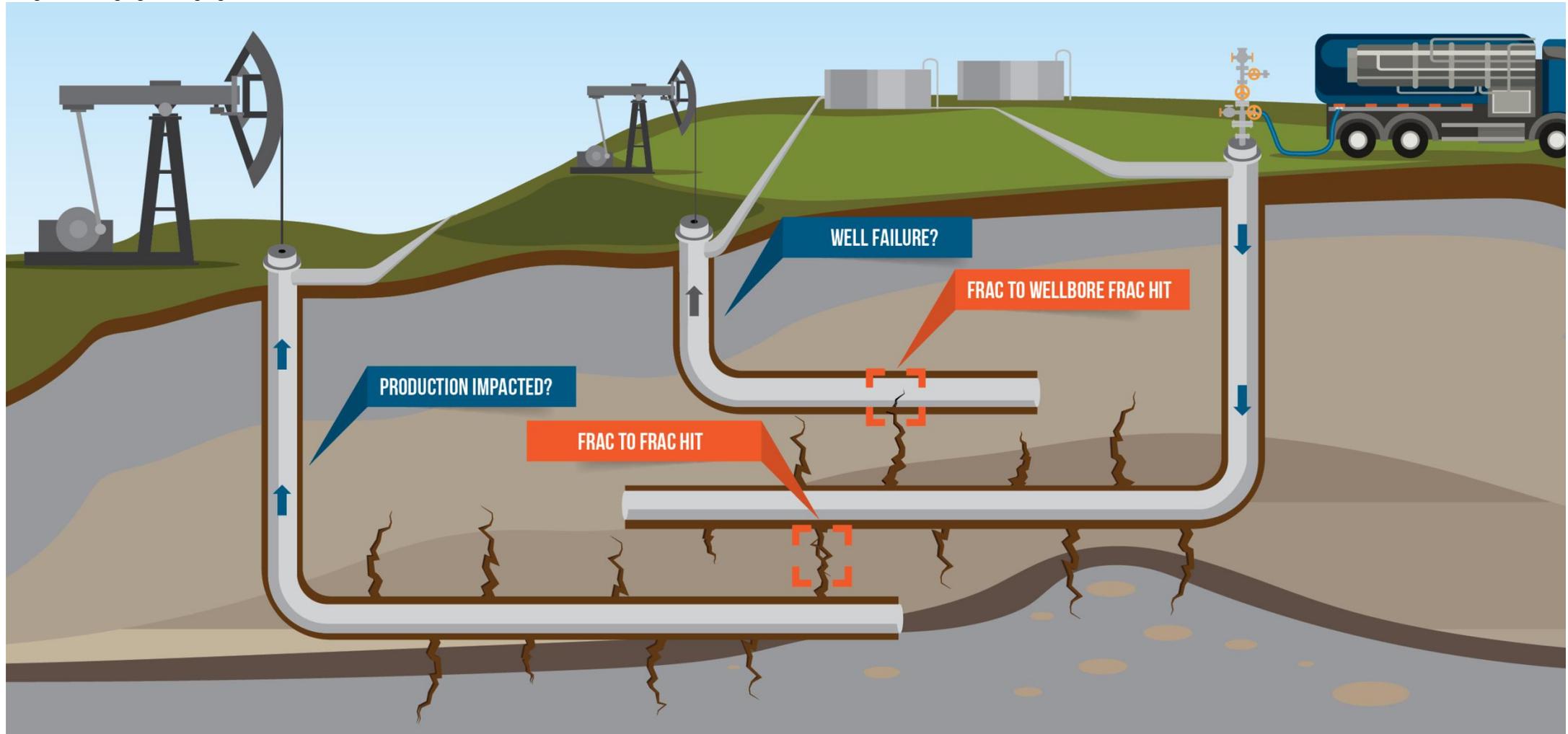
Drawing from Camesa spec sheet



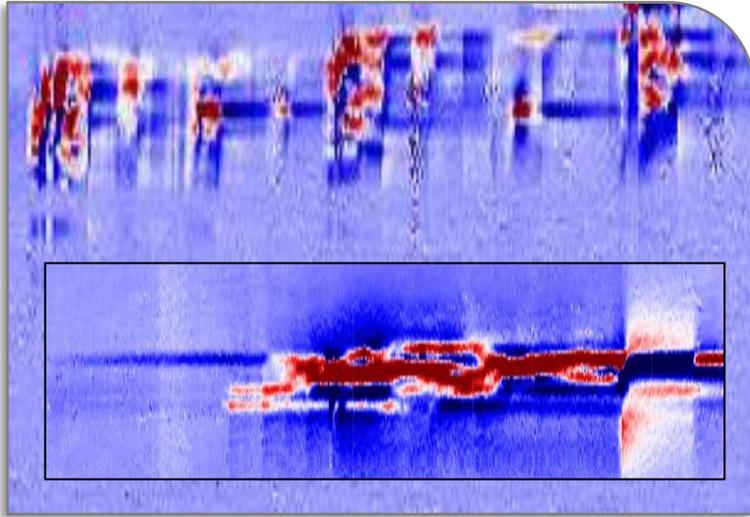
Fibre Optic Wireline
(Mono conductor)

Unconventional wells

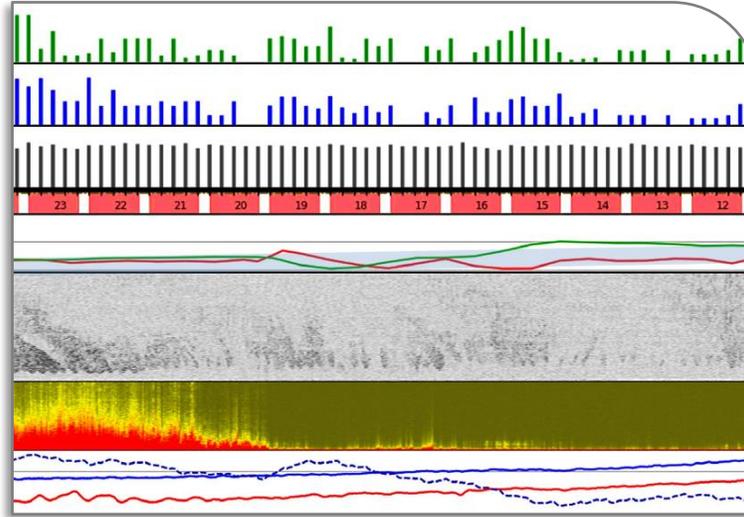
Image from vikingeng.net via google search



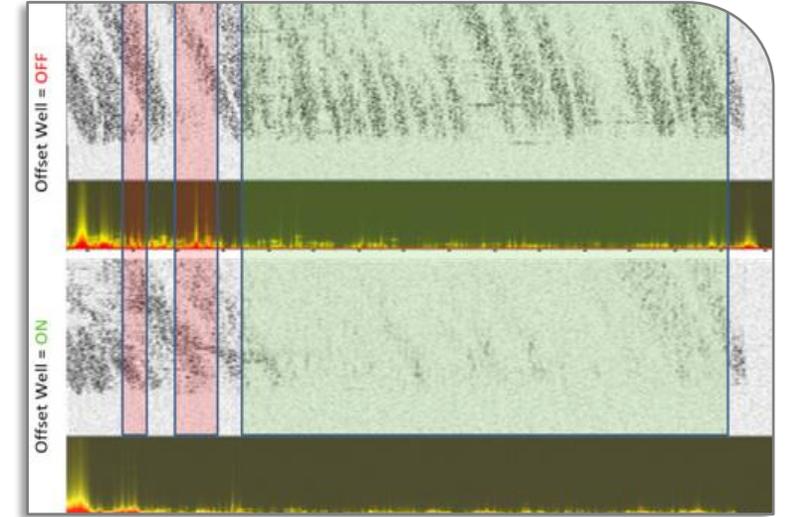
Applications



Frac ILLUMINATOR®:
Frac hits (Fracture Driven Interactions)



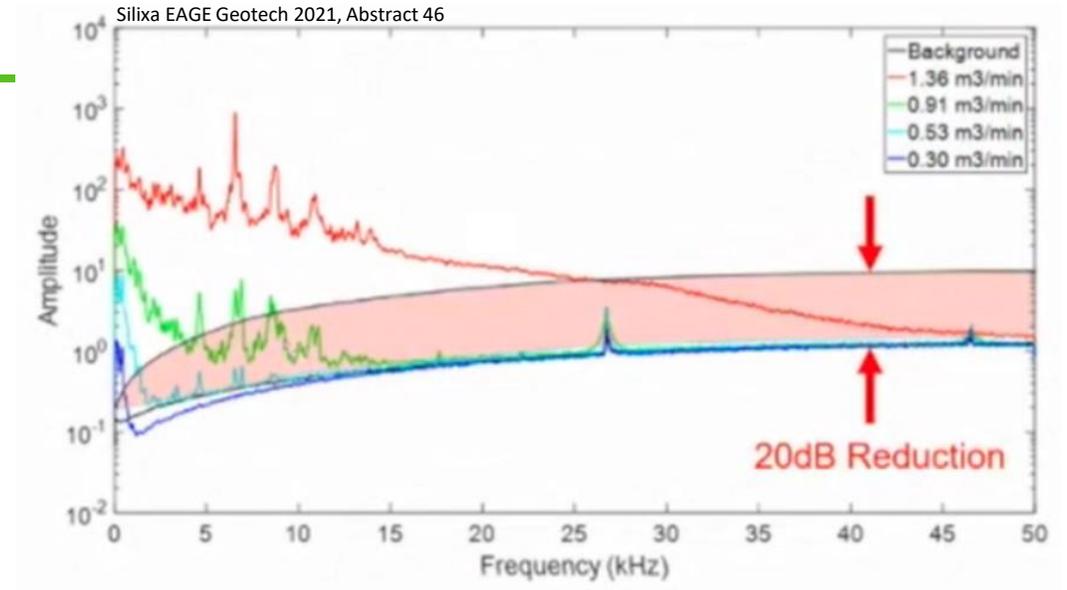
Flow ILLUMINATOR®
Production profiling



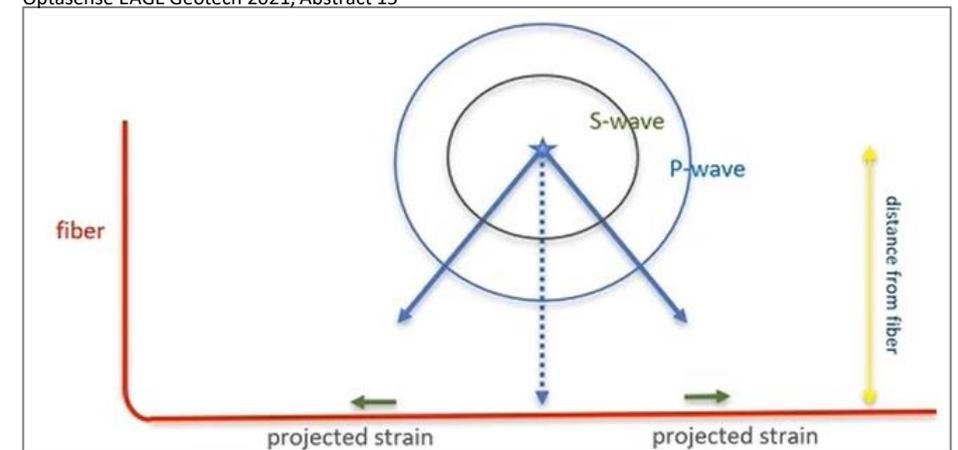
Flow ILLUMINATOR®
Well interference

Challenges

- Standard system SNR:
 - very long wells > 5km MD
 - very quiet flow in the horizontal section
- High temp fibers
 - wet environment
- Tri-axial response: orthogonal P-wave incidence
- Integration w/ reservoir monitoring
 - import format, display: 2D vs 3D
 - machine learning → flow/rock properties
- Transfer functions of cables, temperature correction eg
 - Response of coating material to temperature
- Offshore intervention costs
 - cheaper equipment cost



Optasense EAGE Geotech 2021, Abstract 15



Questions?