

Out of Zone Injection

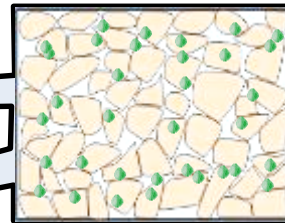
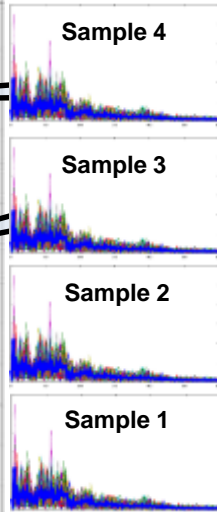
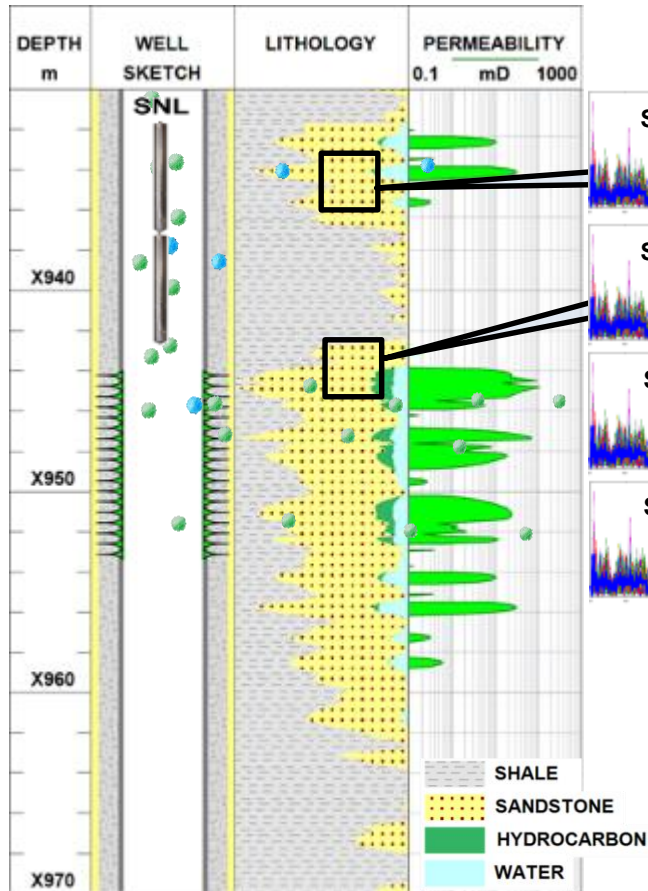
Maxim Volkov, TGT Oilfield Services UK Ltd



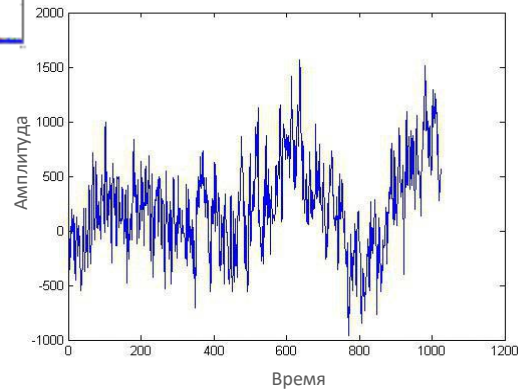
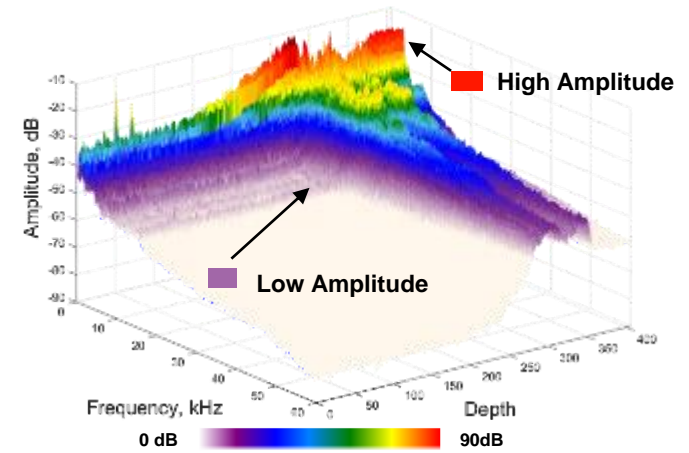
Challenges

- Location of injection zones within perforated and unperforated intervals
- Quantification of reservoir flow profile with characterization of matrix/fracture flow contribution
- Identification injection intervals in a horizontal open-hole section (SSD, ICD, Sandscreens)
- Identification and evaluation of behind-casing flow rates
- Cement and well integrity
- Perforation quality
- Pre and post stimulation

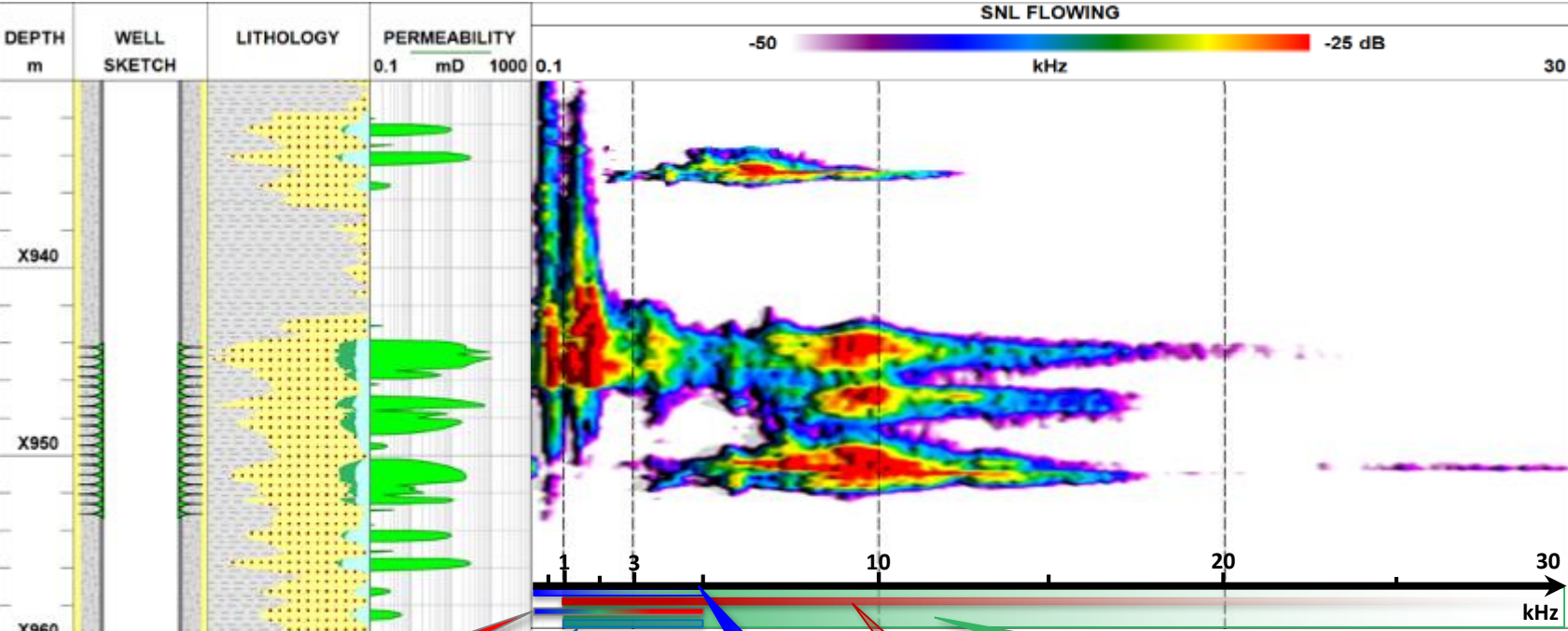
SPECTRAL NOISE PHYSICS



Acoustic noise



NOISE PATTERNS LIBRARY



Wellbore noise

Fluid Gas

Completion elements

Packer, Mandrel, valve setc.

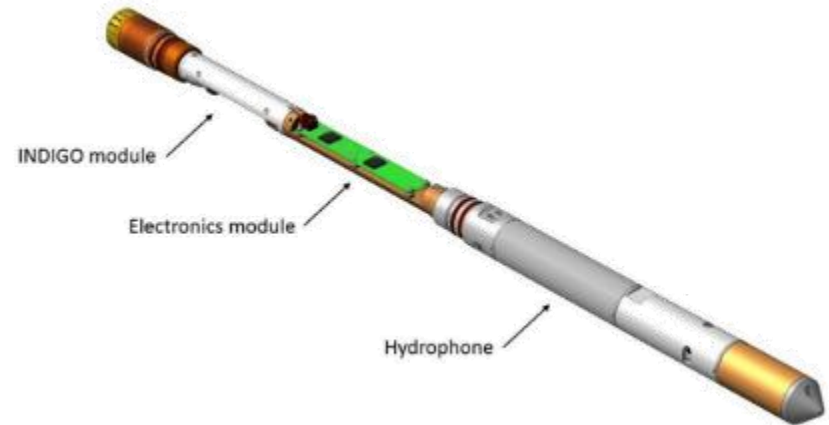
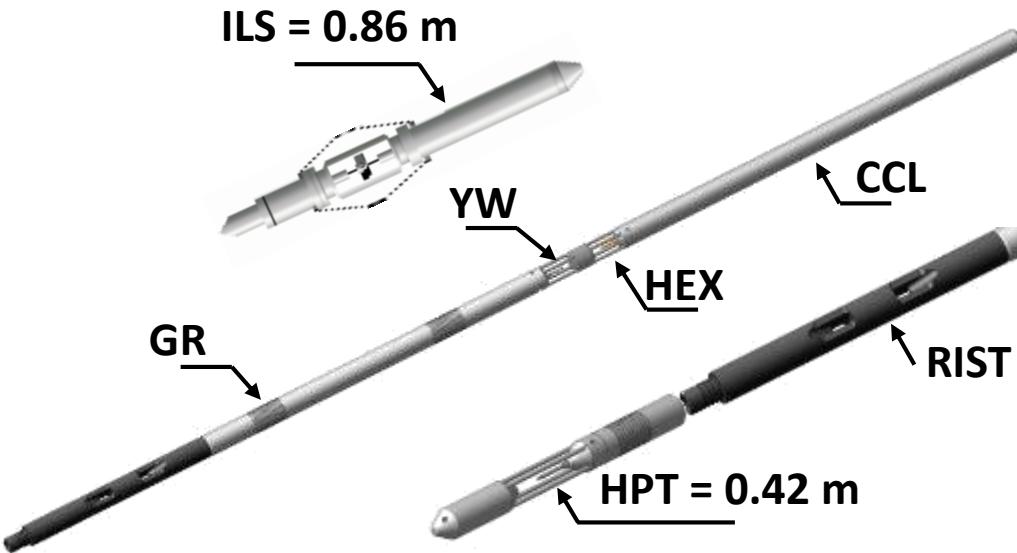
Channeling

Tubing leak

Formation noise

Channels, Faults Fractures Large pores Tight Formations

LOGGING TOOLS



Base Module (HPT)

Max Temperature	302°F
Max Pressure	9000 PSI
Max H ₂ S	< 30 %*
Pressure measurement range	15 — 9000 PSI
Temperature accuracy	0.18 °F
Temperature resolution	0.0018 °F
OD	1.5 inch
Length	1.476 ft

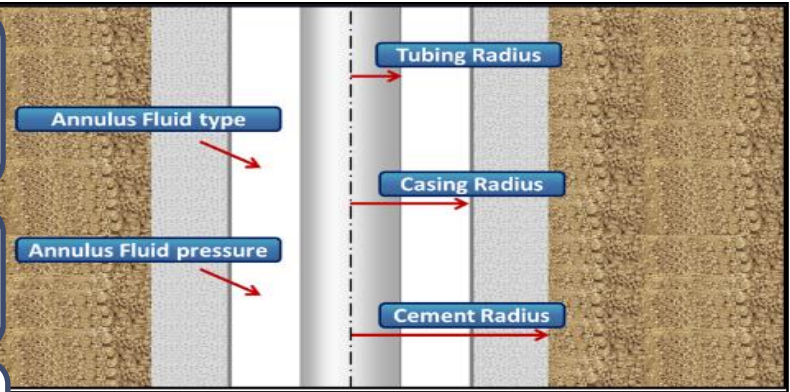
SNL-HD

Max Temperature	302°F
Max Pressure	9000 psi
Max H ₂ S	< 30%
Frequency range, Hz	3-60000
Frequency resolution	115
Dynamic range, dB	90
Memory / SRO	Memory/ SRO ready
OD	1 11/16"
Length	2.68 ft

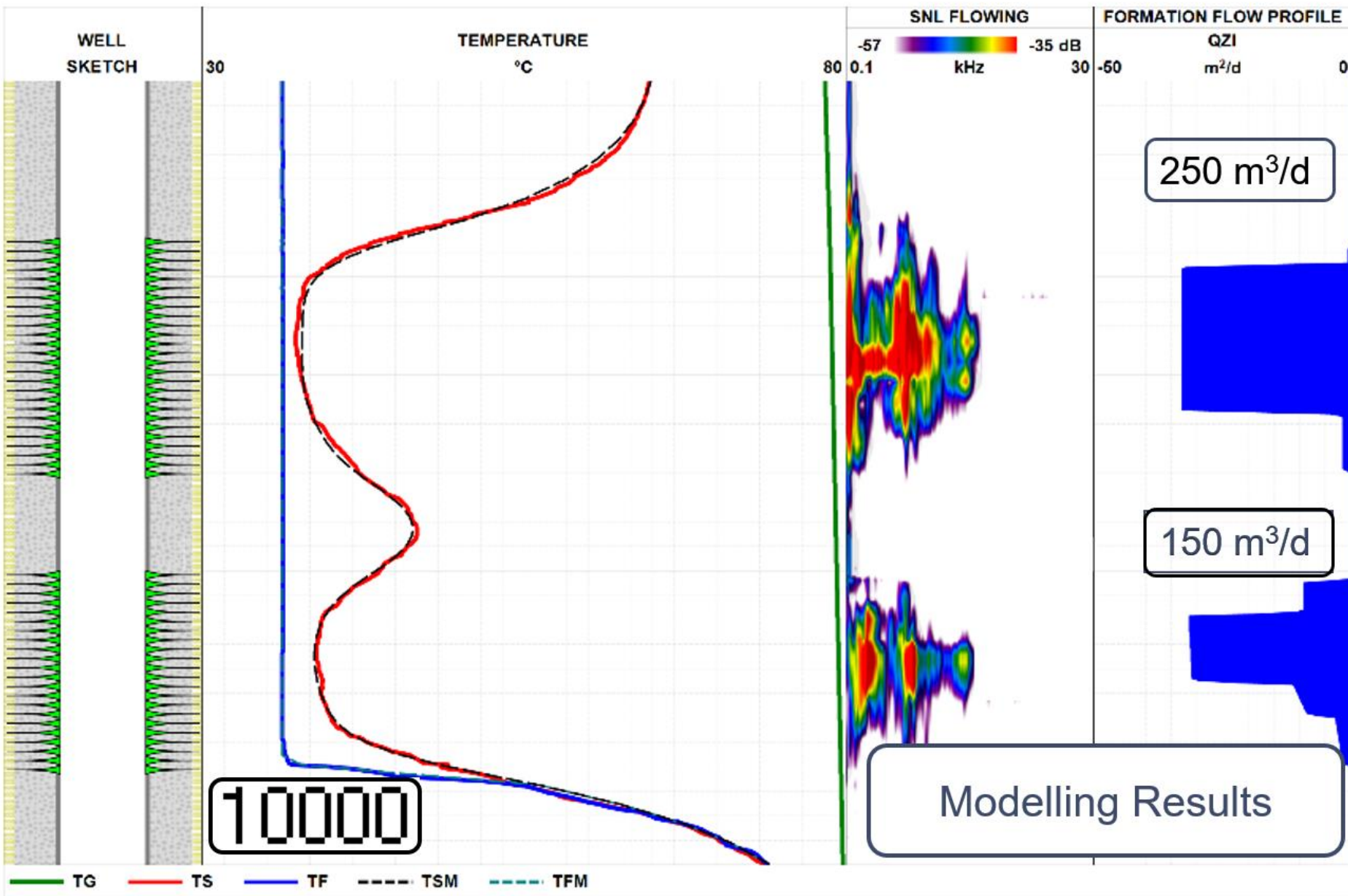
BEHIND CASING FLOW ASSESSMENT: INPUT PARAMETERS



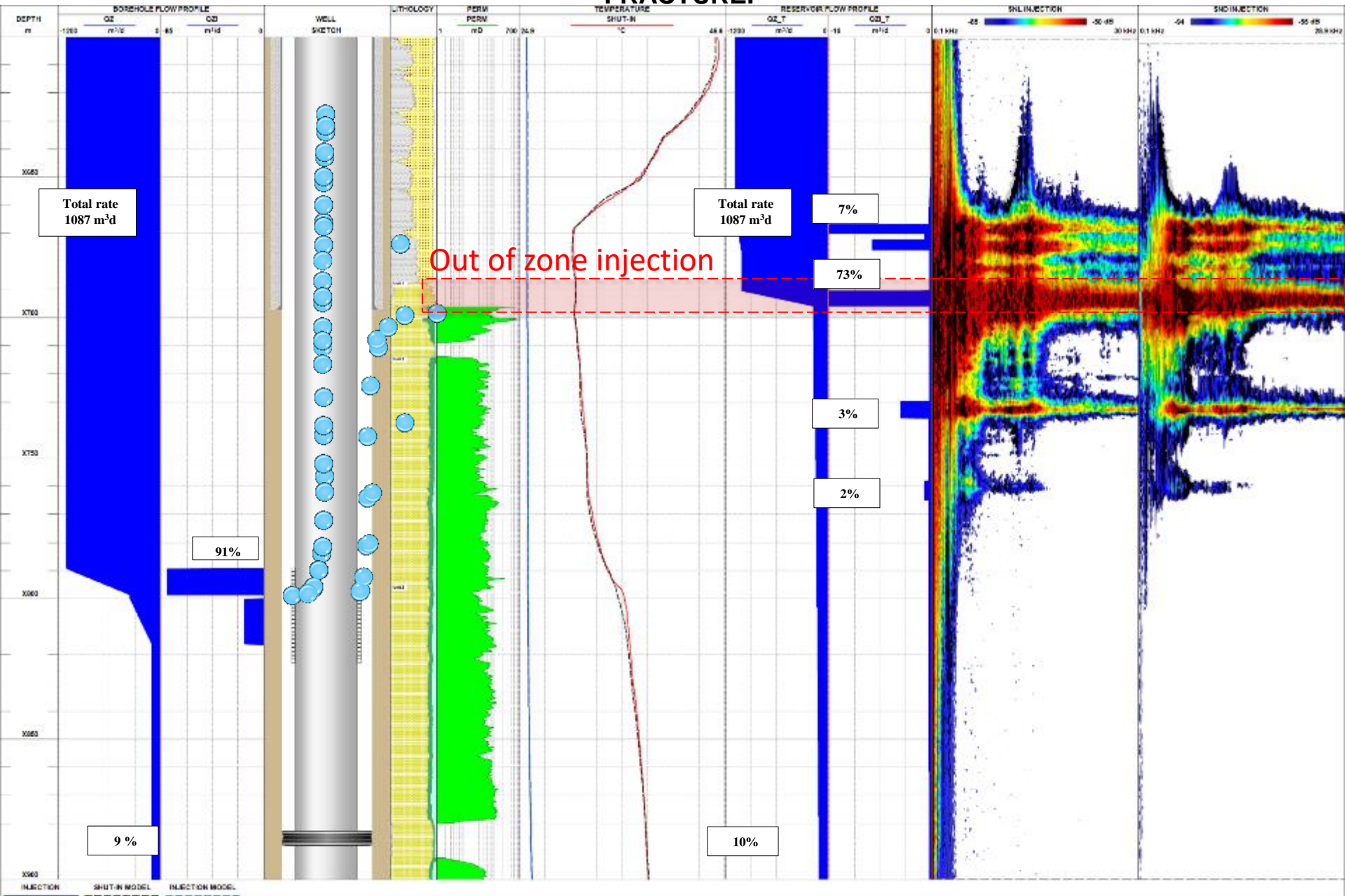
- Injection/Production History
- Well schematic and trajectory
- Thermophysical Rock Properties
- Reservoir Parameters



BEHIND CASING FLOW ASSESSMENT: MODELLING



CASE #1: HORIZONTAL WATER INJECTOR WITH SUSPECTED OUT OF ZONE INJECTION THROUGH FRACTURE.



Thank You / Questions

