

BRINGING WELL ABANDONMENT CEMENT
PLUG OPERATIONS INTO THE 21ST
CENTURY WITH INNOVATIVE DISTRIBUTED
FIBER OPTIC SENSING TECHNOLOGY

Sascha Hale, FrontRow Energy Technology Group

SPE WELL ABANDONMENT CONFERENCE

26 JUNE 2019

Unique
Single use
Disposable
Lightweight
Portable
Low risk
Low cost

FLI - TECHNOLOGY ANIMATION



Introducing a new method of intervention for well surveillance. Fast. Compact. Low Risk.

FLI - LOW FOOTPRINT WELL INTERVENTION

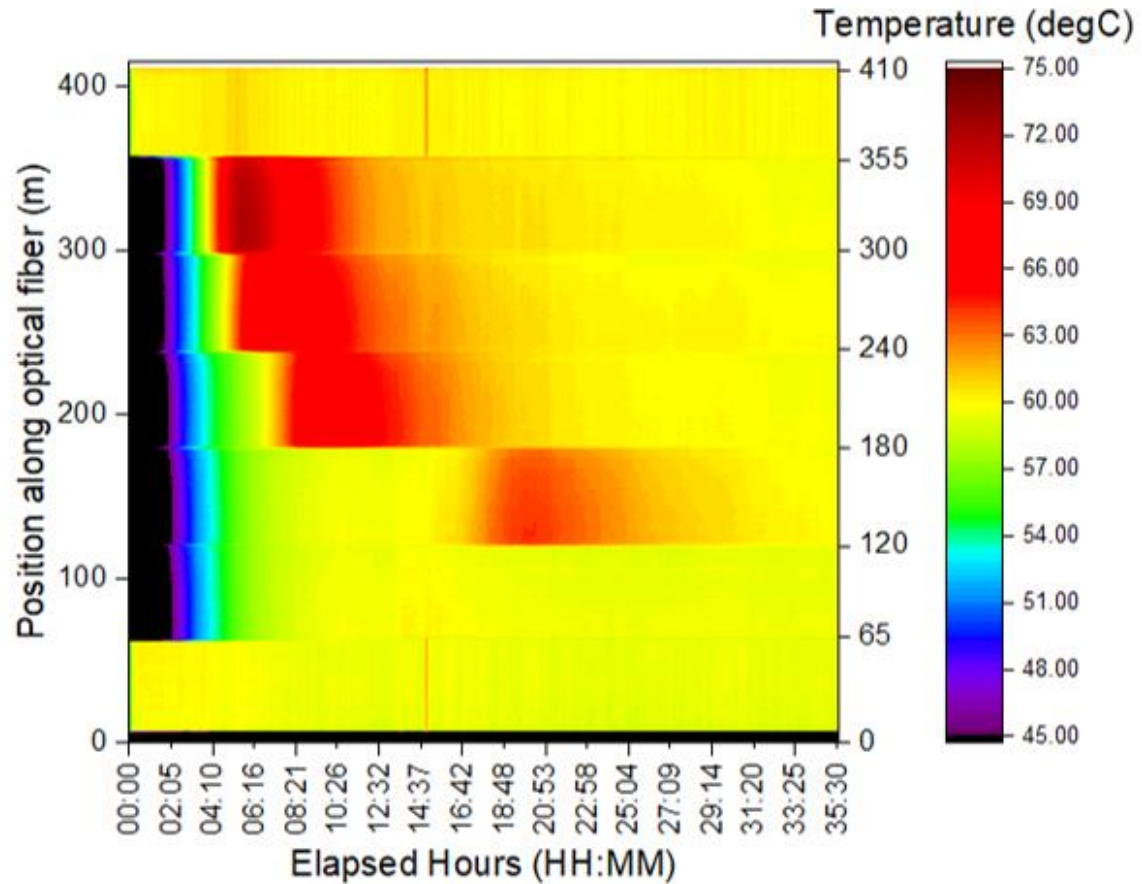


CAN FLI MONITOR A CURING CEMENT PLUG?

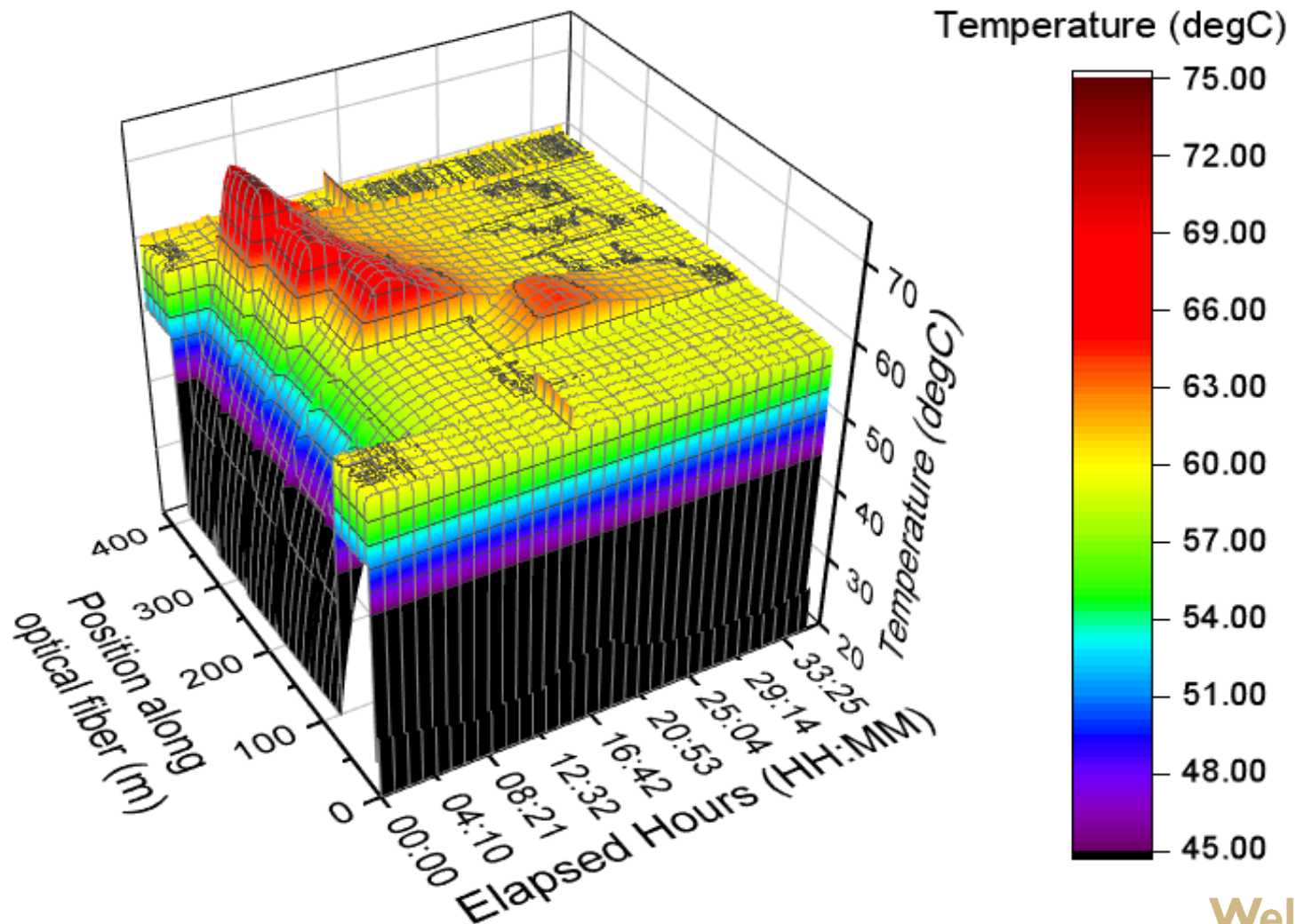
MSc study undertaken to establish:

- Can the fiber optic survive long enough?
- Is it possible to distinguish the curing profile of the cement?
- Is it possible to distinguish voids or contamination?

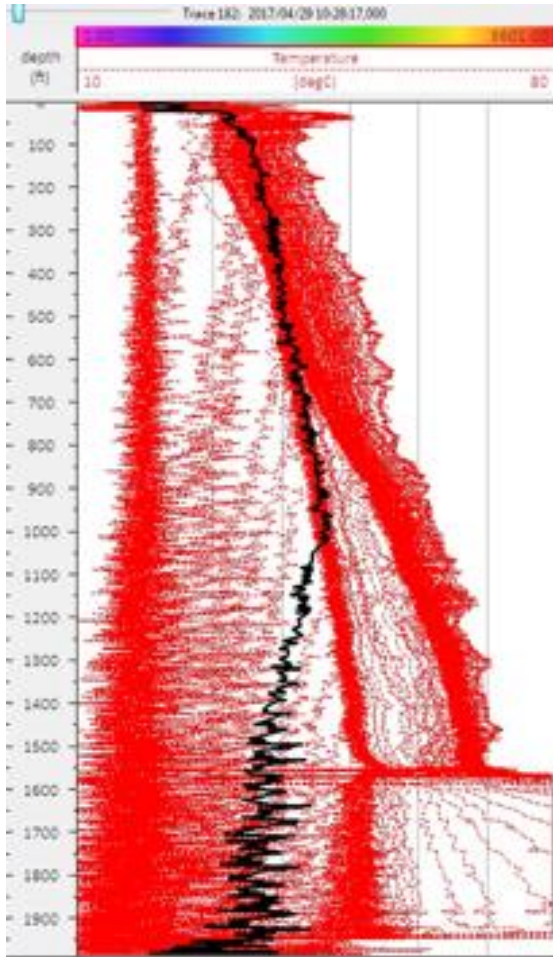
CONTAMINATED CEMENT STUDY 2D PLOT



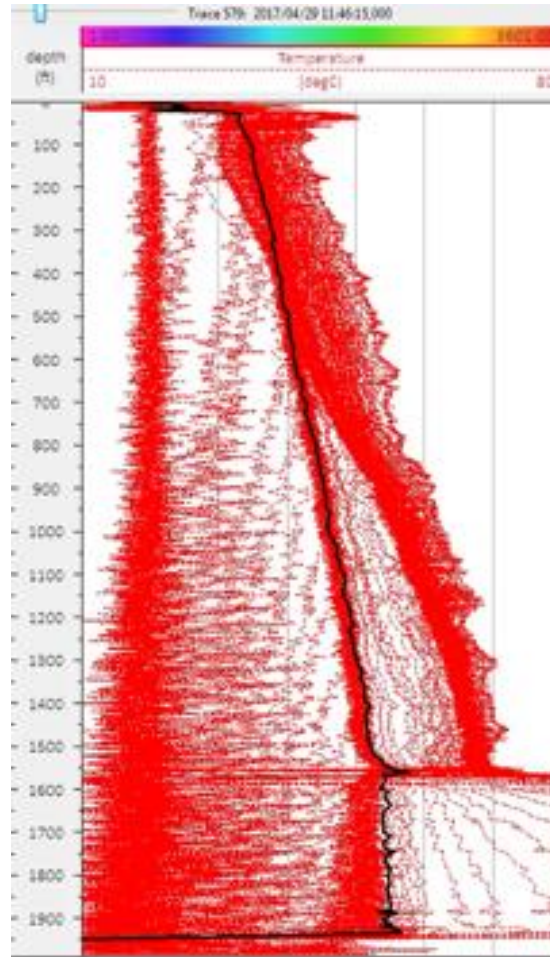
CONTAMINATED CEMENT STUDY 3D PLOT



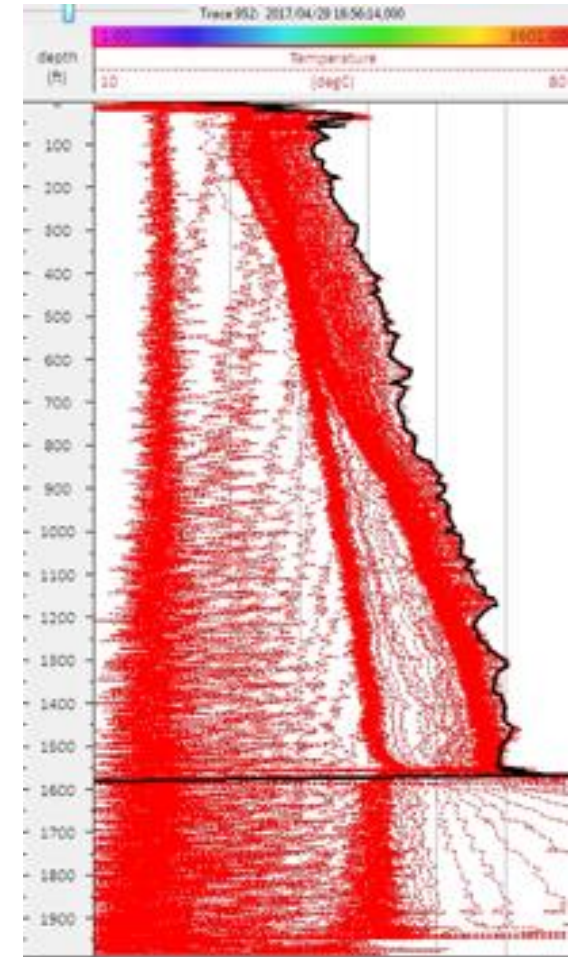
REAL-TIME CEMENT ASSURANCE USING DTS



Probe descending



Probe on bottom
begins monitoring



Max exothermic heating

BENEFITS OF USING FLI TO VERIFY CEMENT PLUG INTEGRITY

- **Real-time monitoring** of cement plug operations for execution quality control
- **Reducing WOC time** by several hours for every cement plug
- **Evidential proof** of adherence to guidelines and/or regulations
- **Optimisation and standardisation** of cement plug operations for multi-well abandonment campaigns
- **Low risk** technology that is very unlikely to directly cause non-productive time if it does not perform as expected

OTHER APPLICATIONS

- Production logging
 - Gas lift optimization
 - Fracture diagnostics
 - Stimulation diagnostics
 - Steam injection/ SAGD monitoring
- Leak detection
- Annular & cement plug monitoring
- Vertical seismic profiling



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