

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

SPE WELL ABANDONMENT CONFERENCE
26 JUNE 2019

Unique
Single use
Disposable
Lightweight
Portable
Low risk
Cost effective

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?

CAN FLI MONITOR A CURING CEMENT PLUG?



Cal2

100%/0%
Cement/spacer

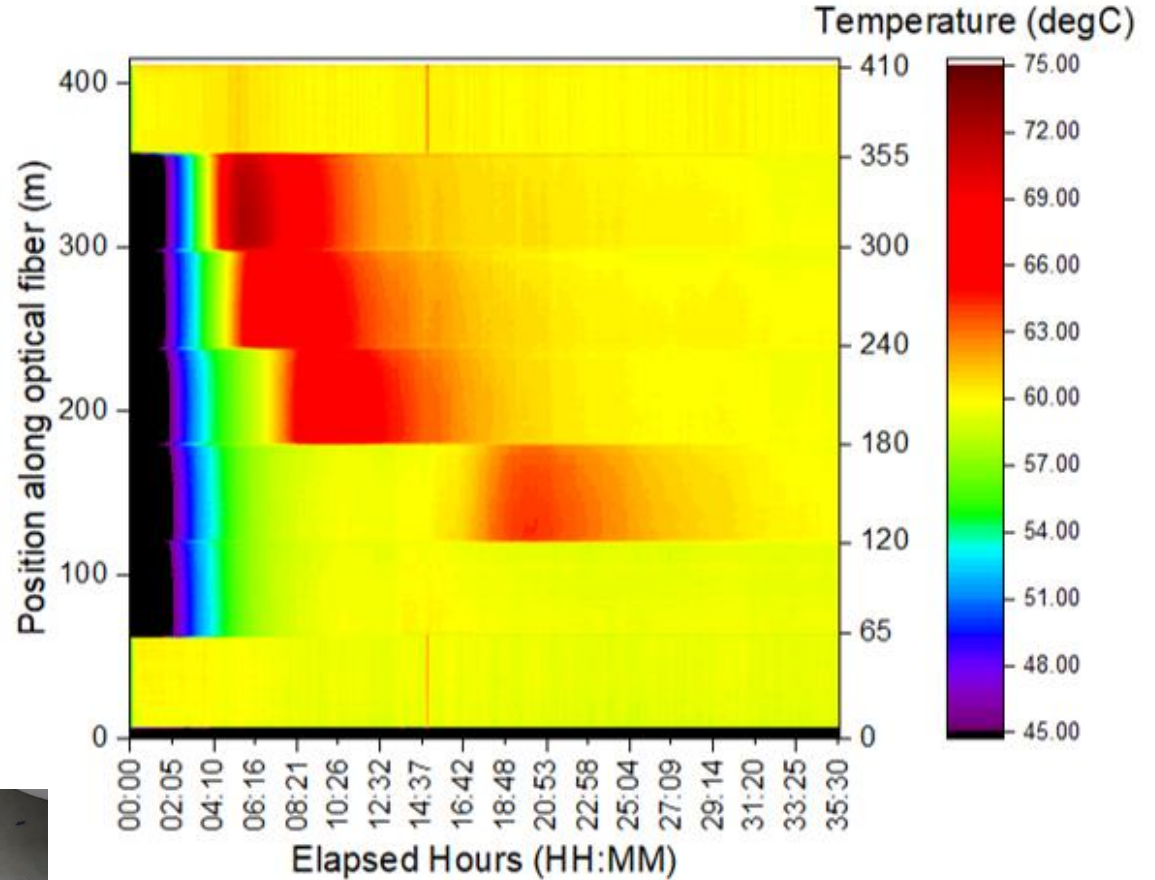
83%/17%
Cement/spacer

66%/33%
Cement/spacer

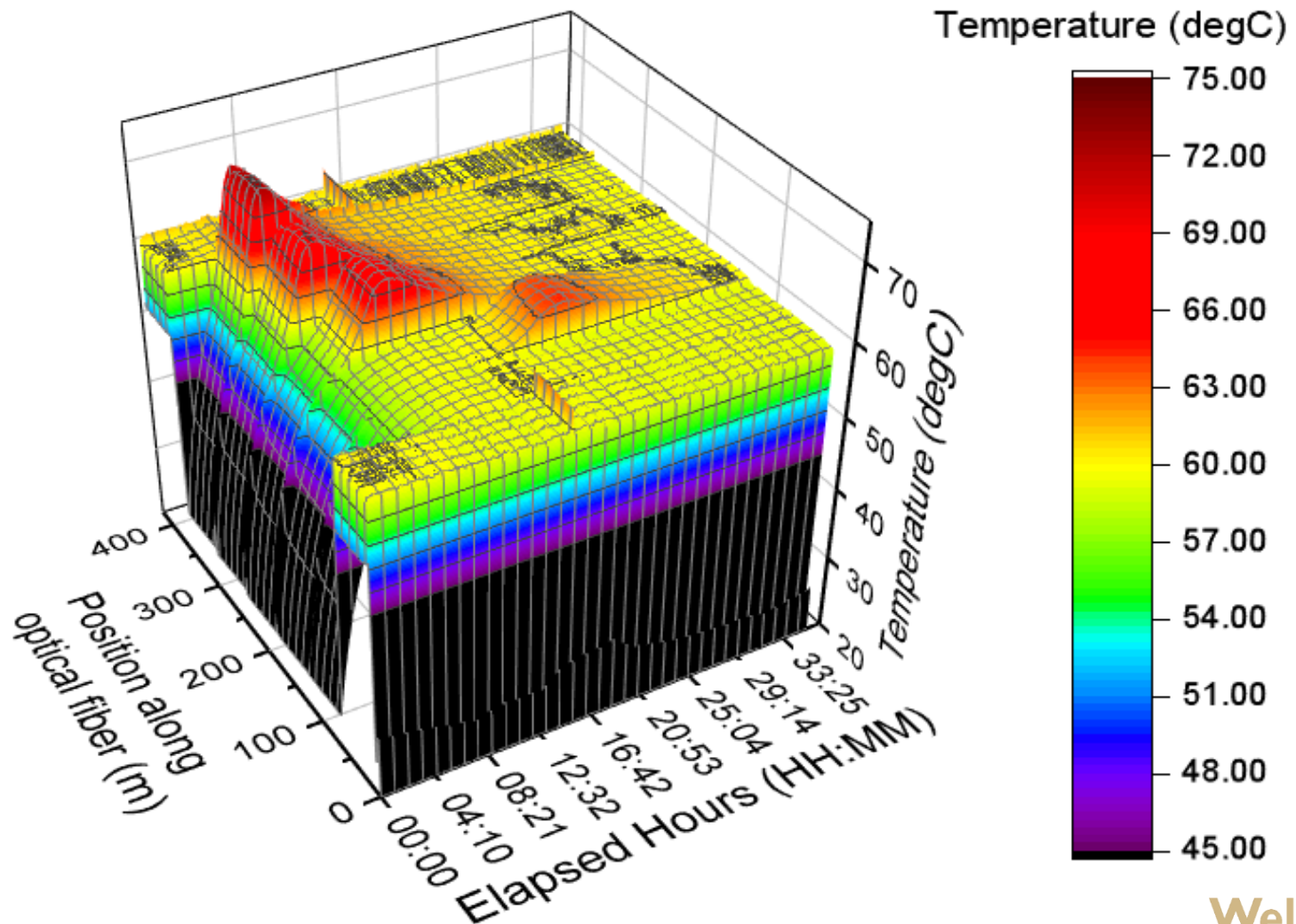
50%/50%
Cement/spacer

0%/100%
Cement/spacer

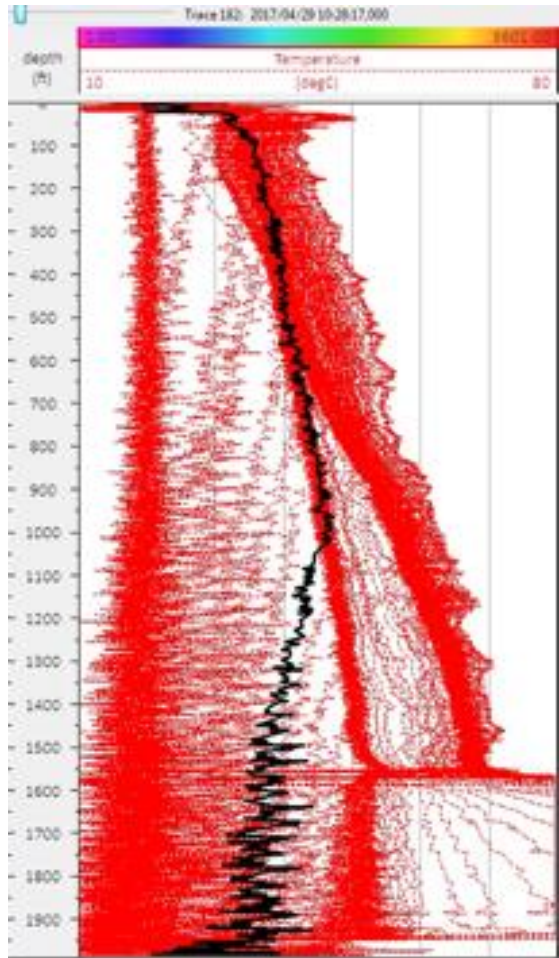
Cal1



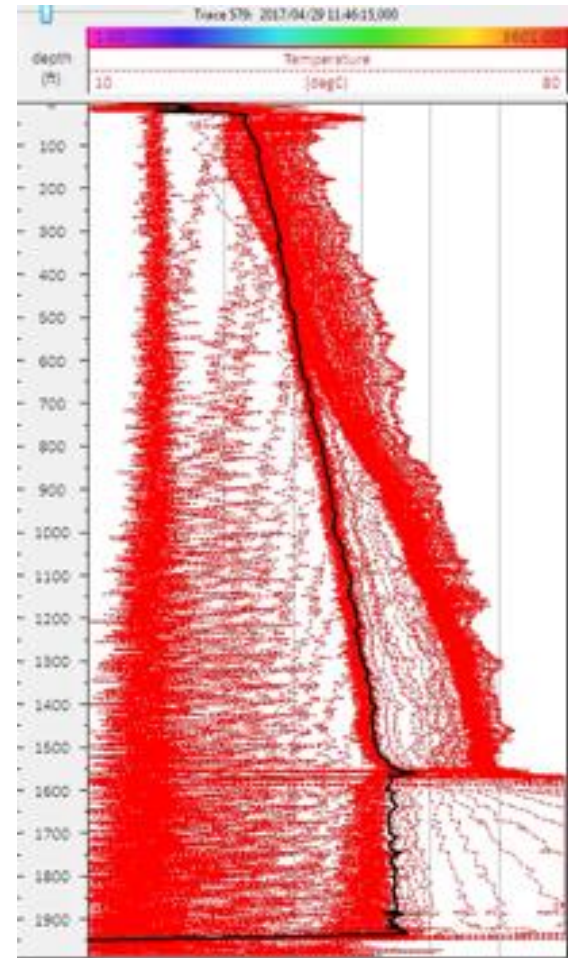
FLI MONITORS DISTRIBUTED TEMPERATURE OVER 33 HOURS



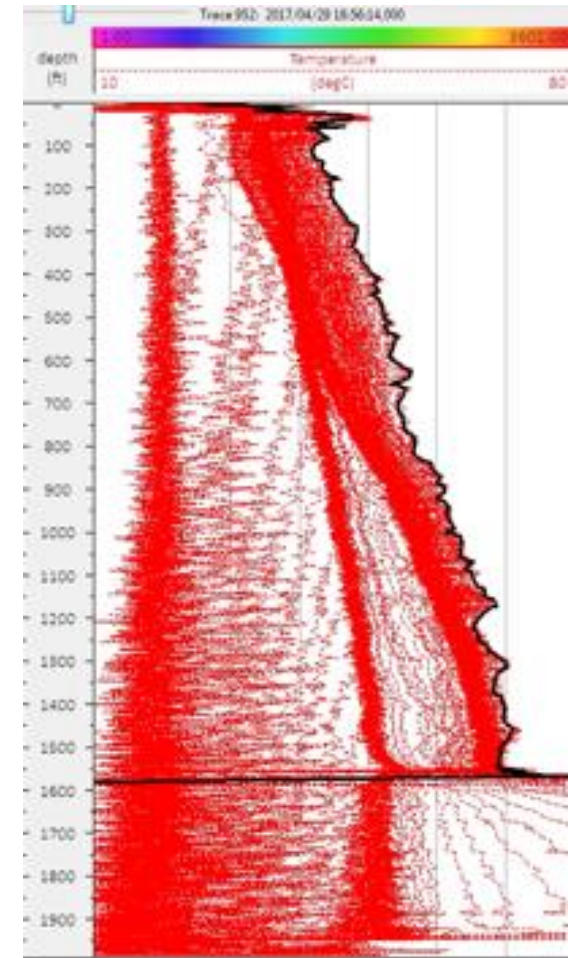
REAL-TIME CEMENT ASSURANCE USING DTS



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



ANY QUESTIONS?

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