CSI TECHNOLOGIES
A SUPERIOR ENERGY SERVICES COMPANY

EPOXY RESIN DEMONSTRATES INTEGRITY & FINANCIAL ADVANTAGES IN O&G WELL ABANDONMENTS

Tyler James: IOGCC 2018

DEVELOPMENT DRIVEN. FIELD FOCUSED.

QUALITY SYSTEM CERTIFICATION ISO 9001:2008
DNV

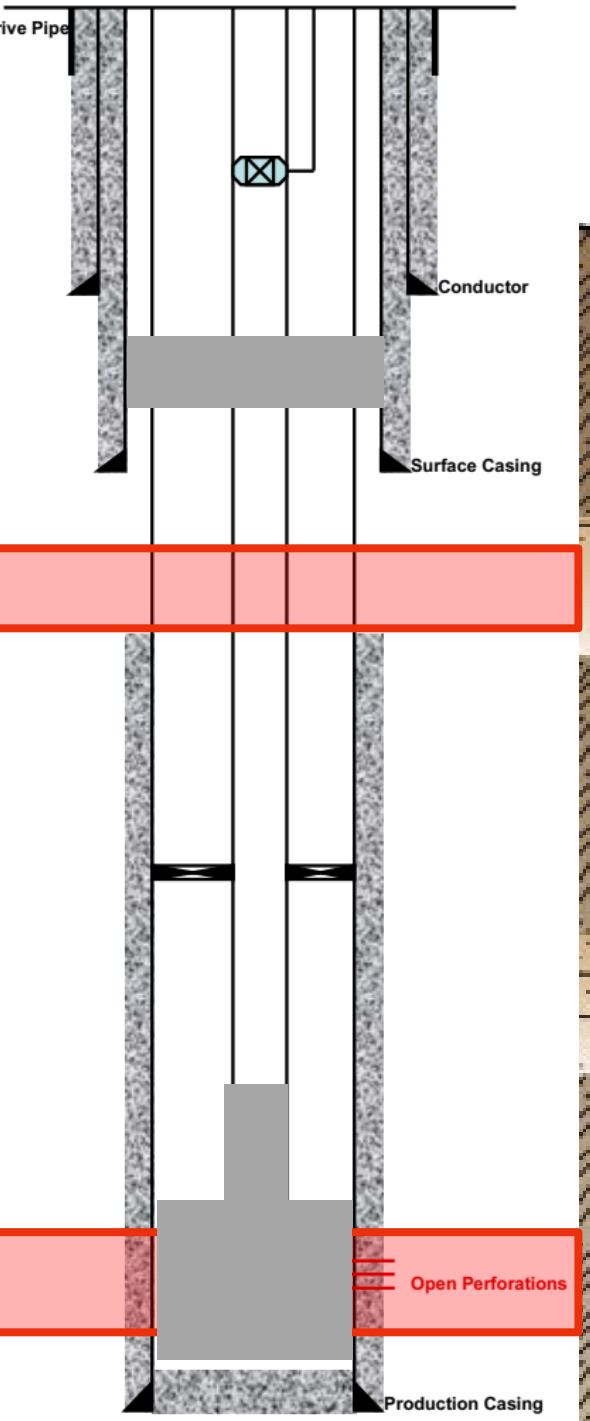
CSI Technologies, LLC

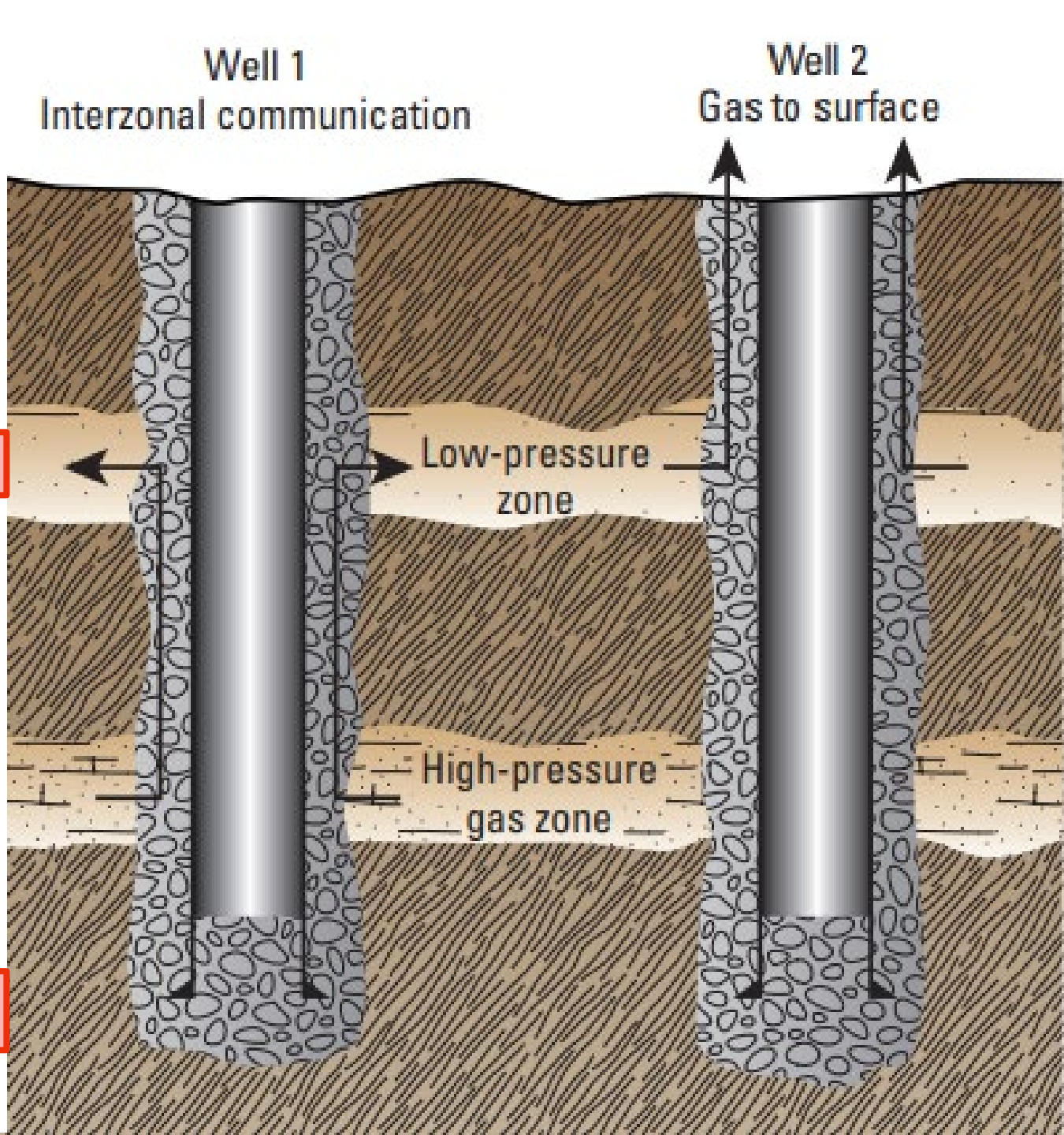
1. Research Quality Lab
2. Team of Well Integrity Specialists

The Number of Wells Needing to be Plugged and Abandoned

Why is it a problem: **Cost**

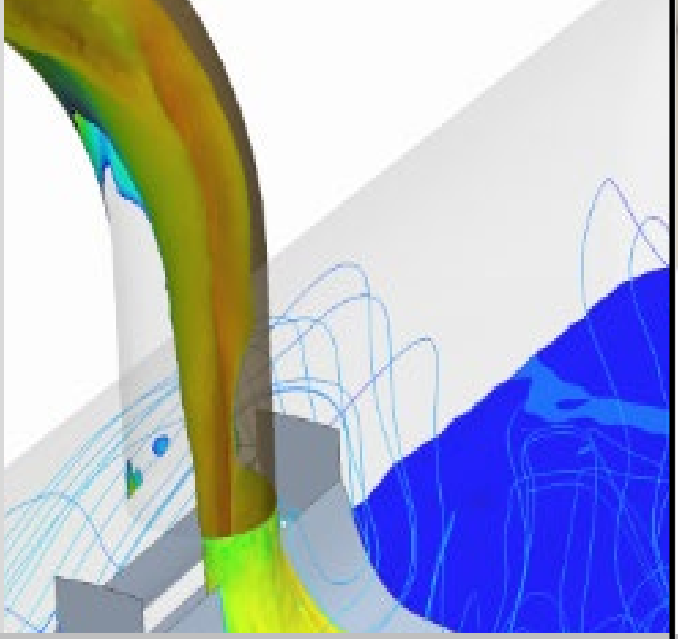
Why plug and abandon: **Risk**


ive Pipe
Conductor
Surface Casing
Open Perforations
Production Casing


Well 1
Interzonal communication
Well 2
Gas to surface
Low-pressure zone
High-pressure gas zone

The cost to restore zonal isolation for uneconomic wells

The Solution: Reduce Cost



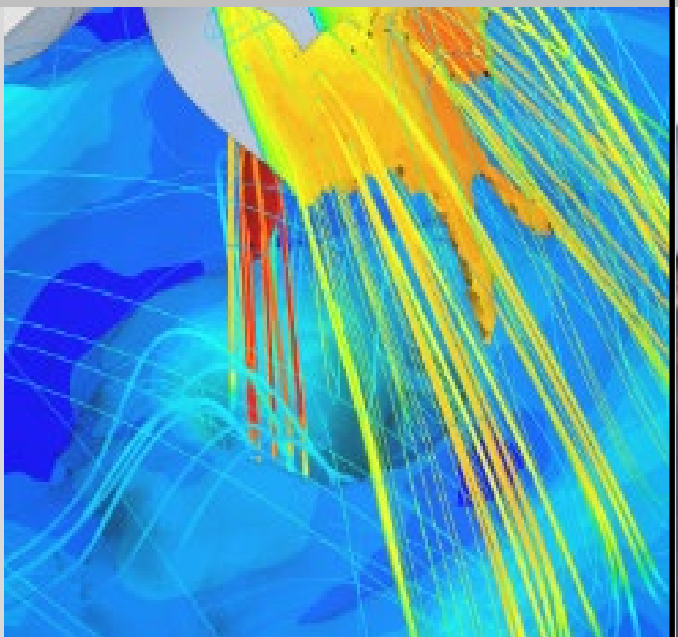
AUTHORITY AND DEFINITION OF TERMS

§250.101	Authority a
§250.102	What does
§250.103	Where can requireme
§250.104	How may I regulations
§250.105	Definitions

Evaluate

Innovate

Re-regulate



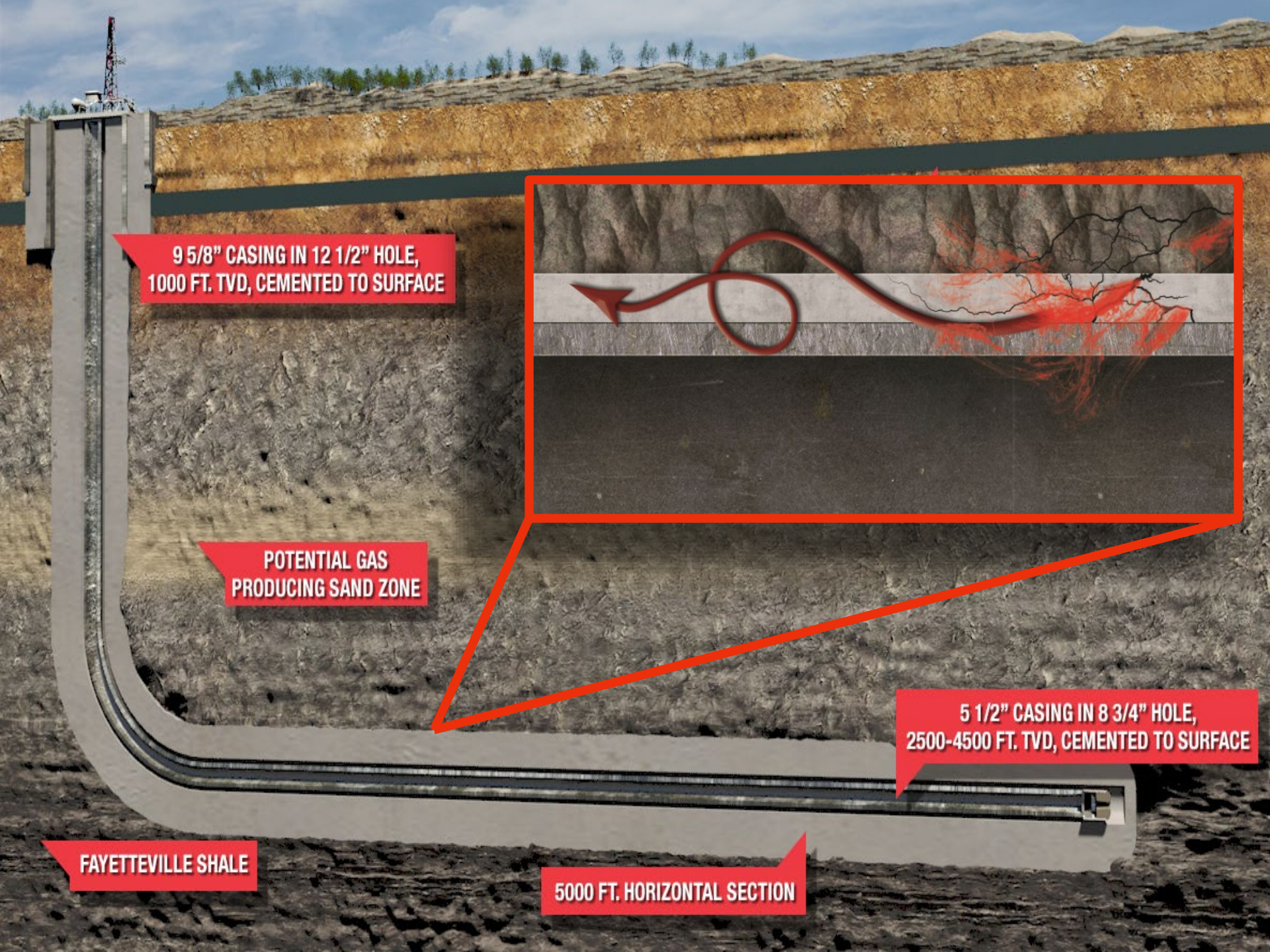
§250.107	What must and the en
§250.108	What requ other mate
§250.109	What docu related to
§250.110	What must
§250.111	Who overs

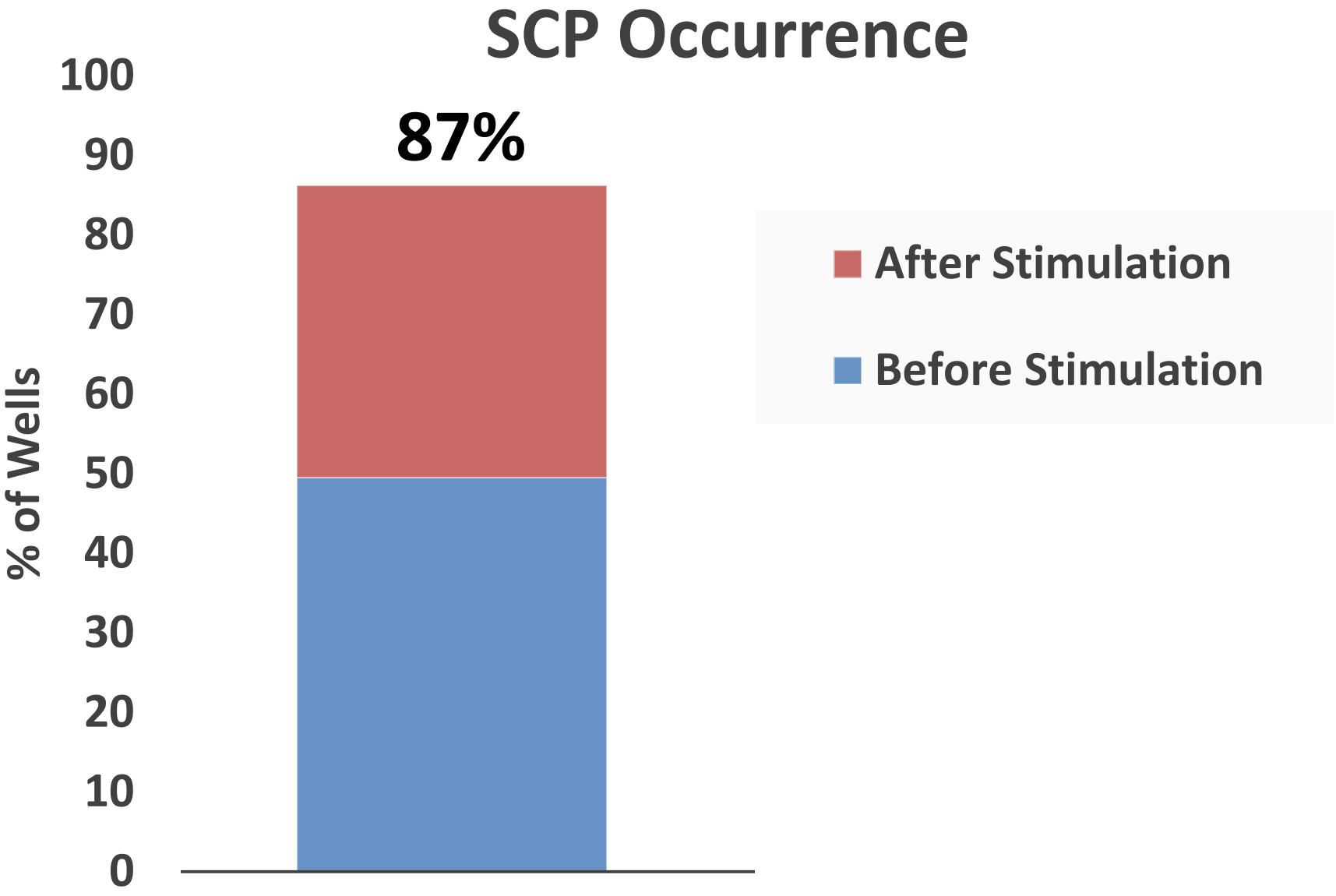
Evaluate

CSI TECHNOLOGIES

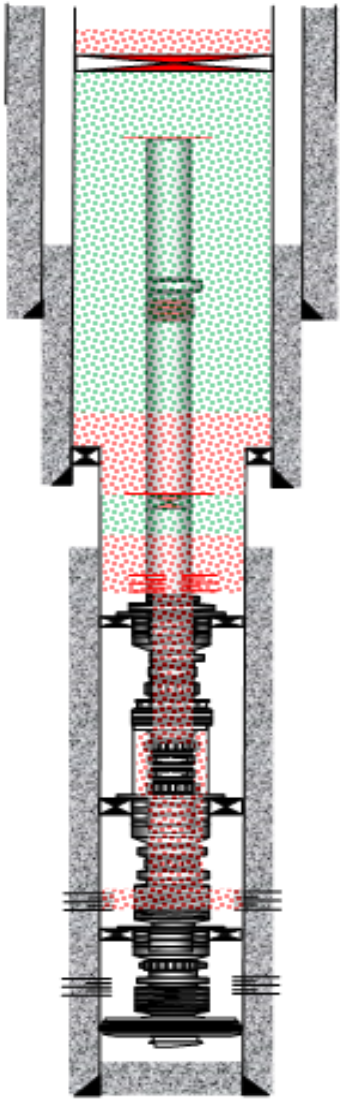
Evaluate post P&A well integrity

Evaluate P&A cost

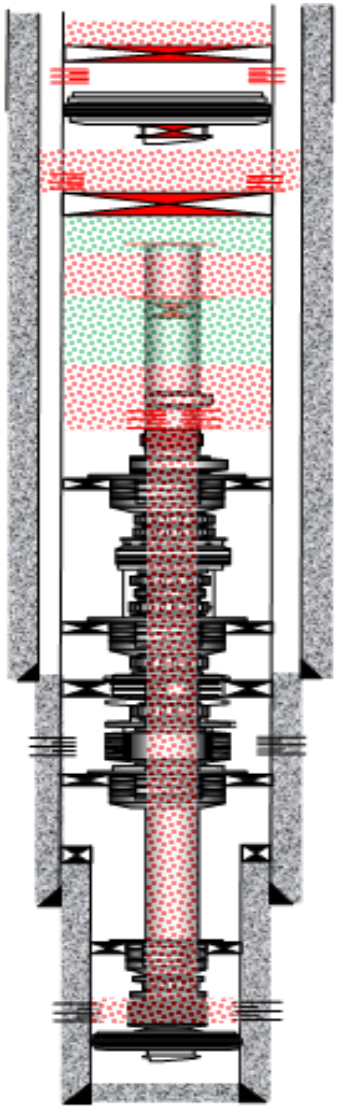

9 5/8" CASING IN 12 1/2" HOLE,
1000 FT. TVD, CEMENTED TO SURFACE
POTENTIAL GAS
PRODUCING SAND ZONE
5 1/2" CASING IN 8 3/4" HOLE,
2500-4500 FT. TVD, CEMENTED TO SURFACE
FAYETTEVILLE SHALE
5000 FT. HORIZONTAL SECTION


SCP Occurrence
87%
% of Wells
100
90
80
70
60
50
40
30
20
10
0
After Stimulation
Before Stimulation

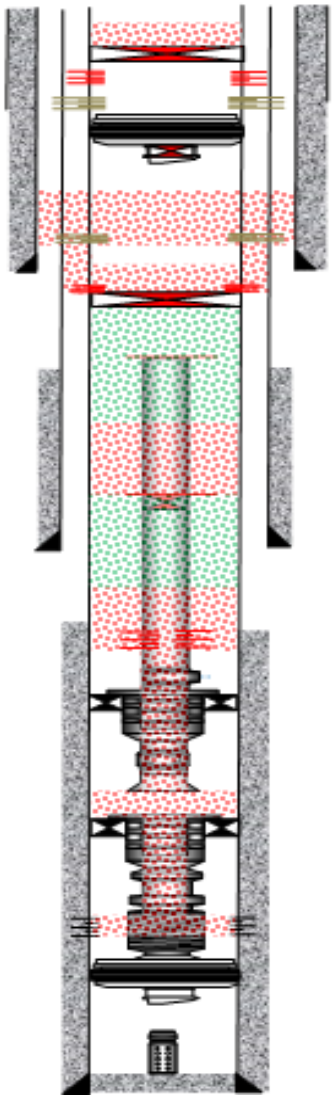
A Annulus



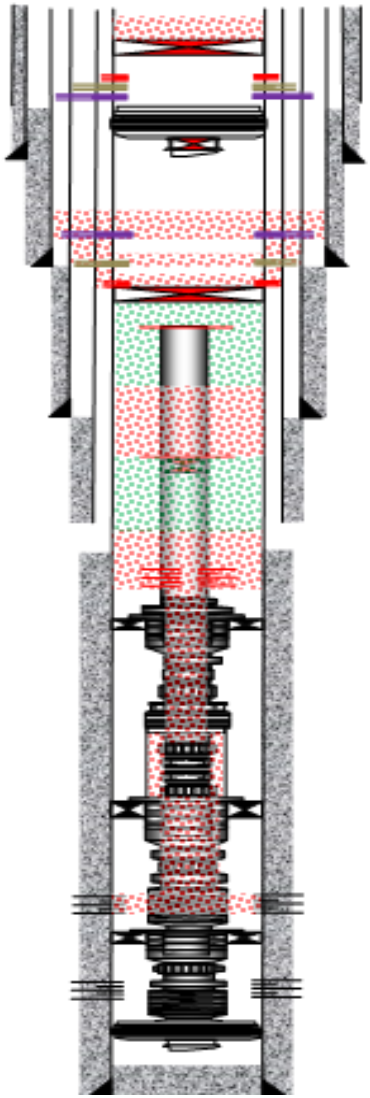
B Annulus



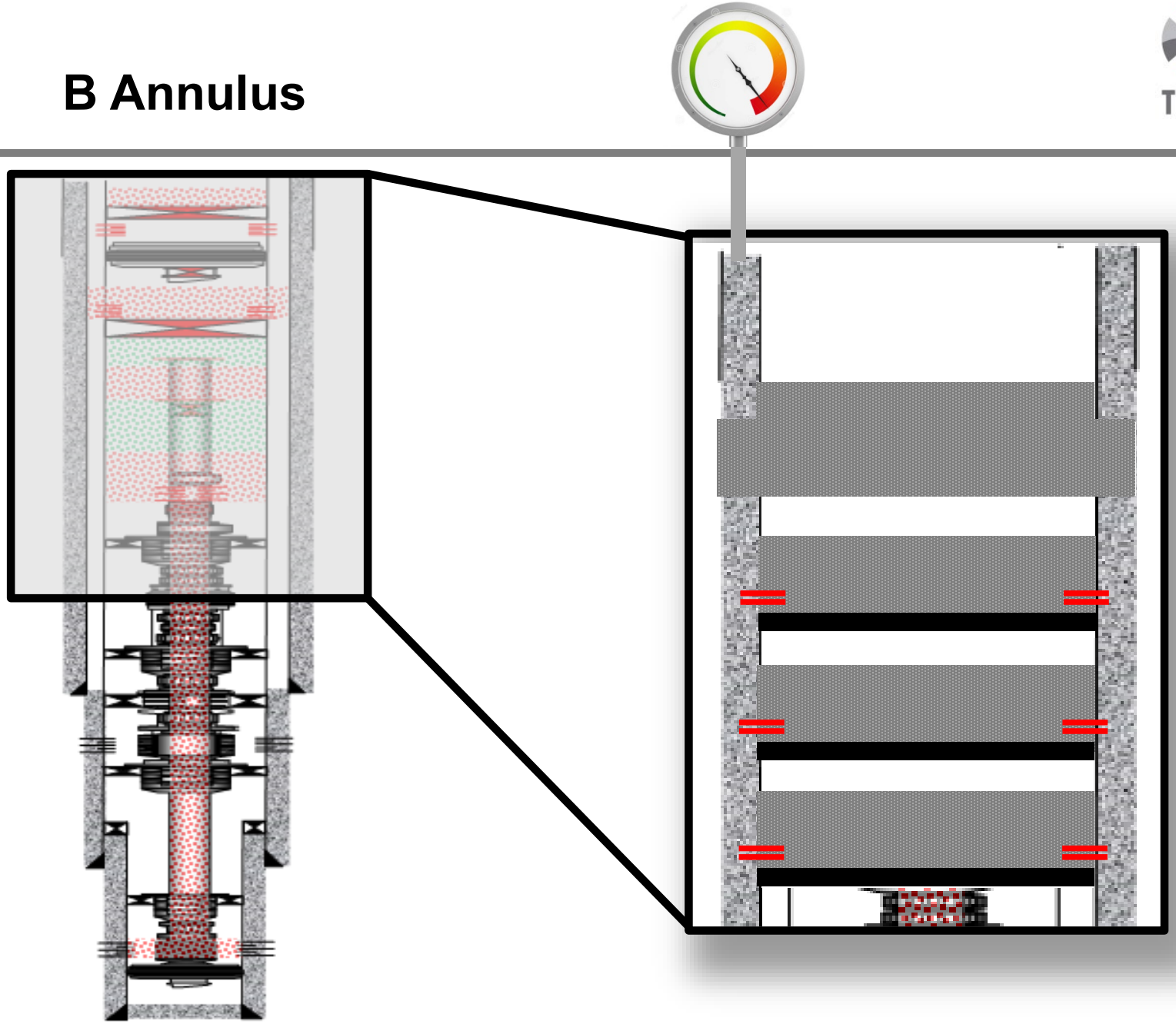
B & C Annuli



B, C, & D Annuli



B Annulus



Evaluate

CSI TECHNOLOGIES

Evaluate post P&A well integrity

- Moving in the correct direction

Evaluate P&A cost

- Identify largest impact areas

CSI TECHNOLOGIES

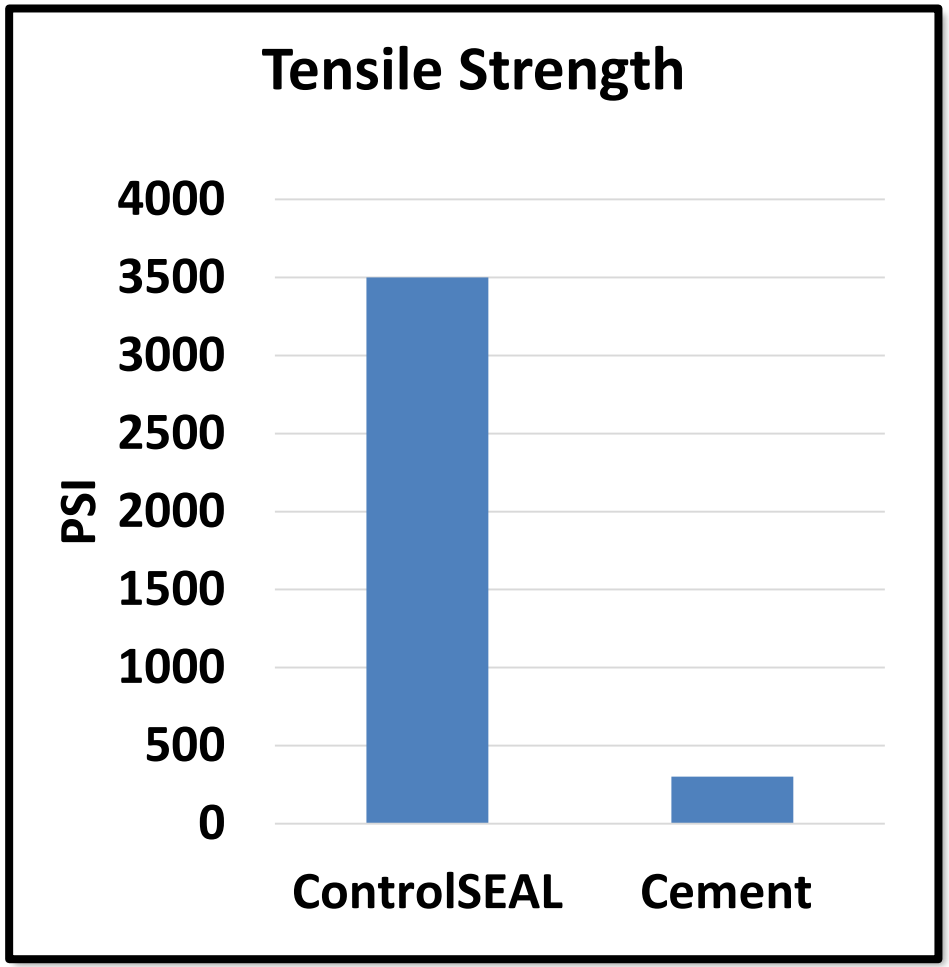
Alternative methods to place barrier material

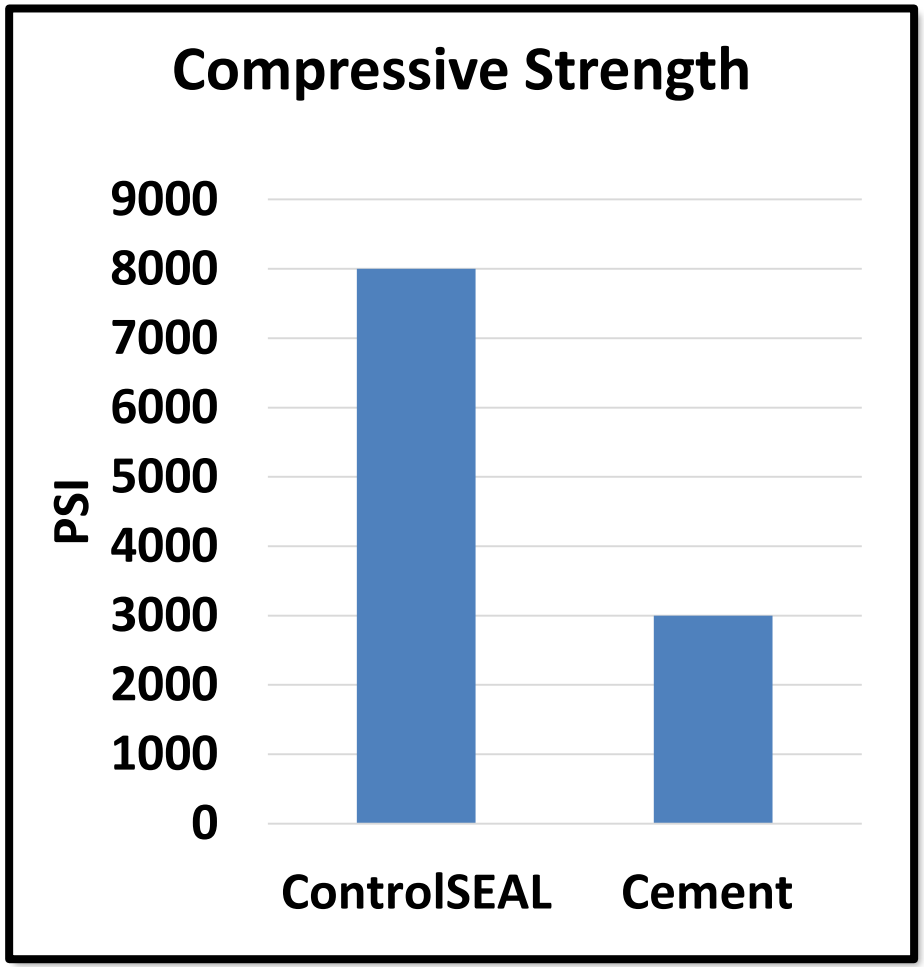
Alternative barrier materials

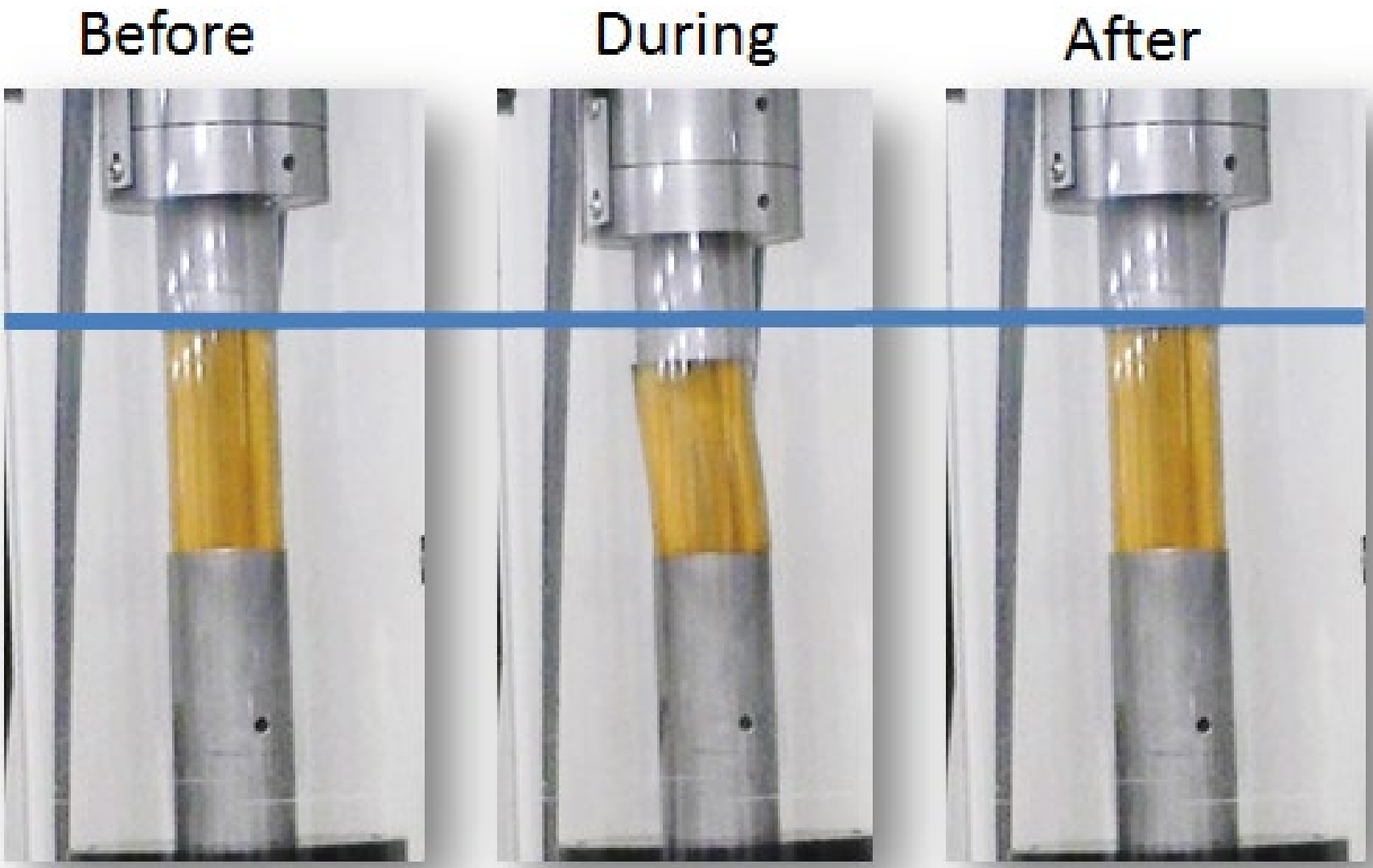
Alternative barrier materials

- Mechanical Failures
- Micro-annulus
- Dehydration
- Chemical Attack
- Contamination

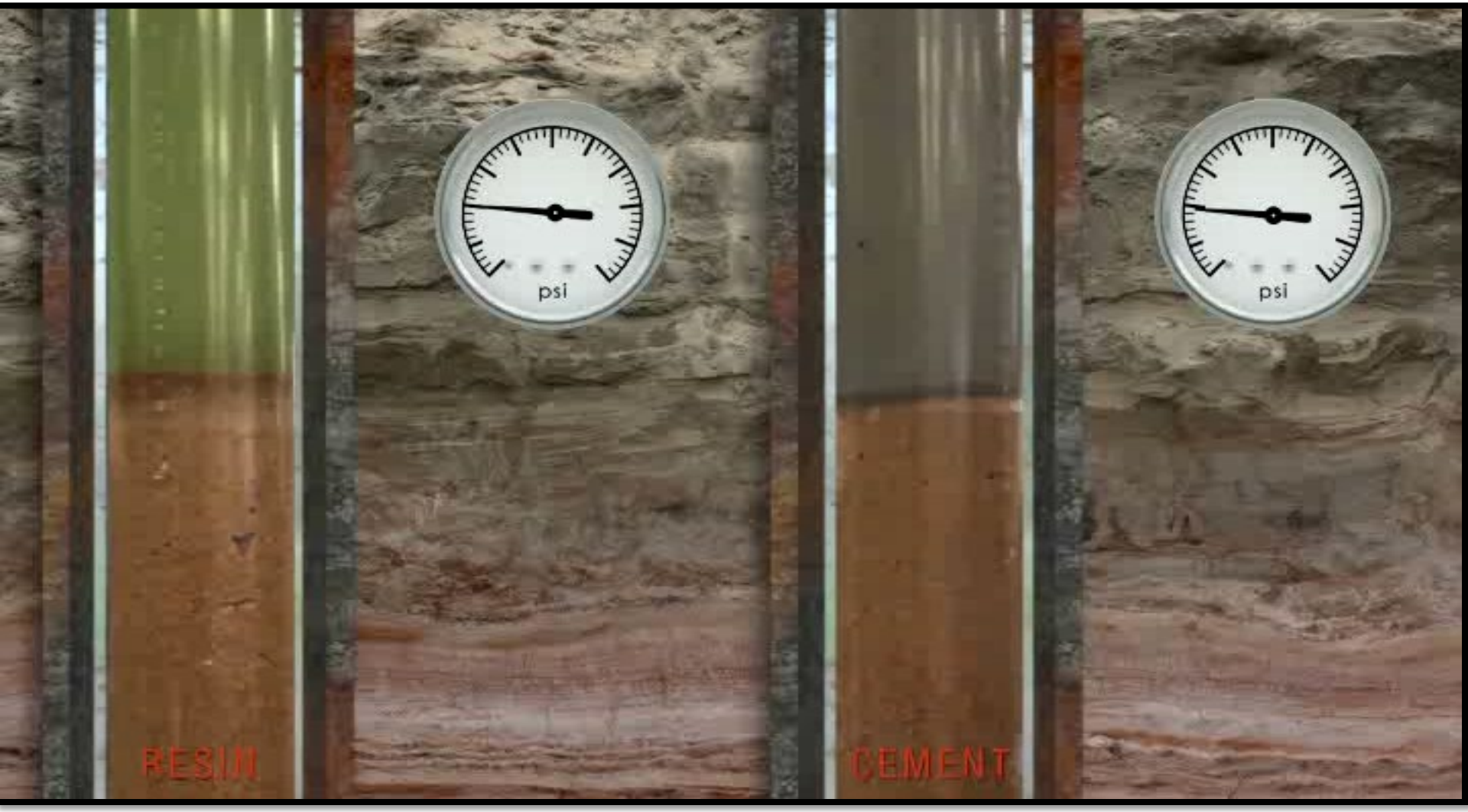
Mechanical Properties



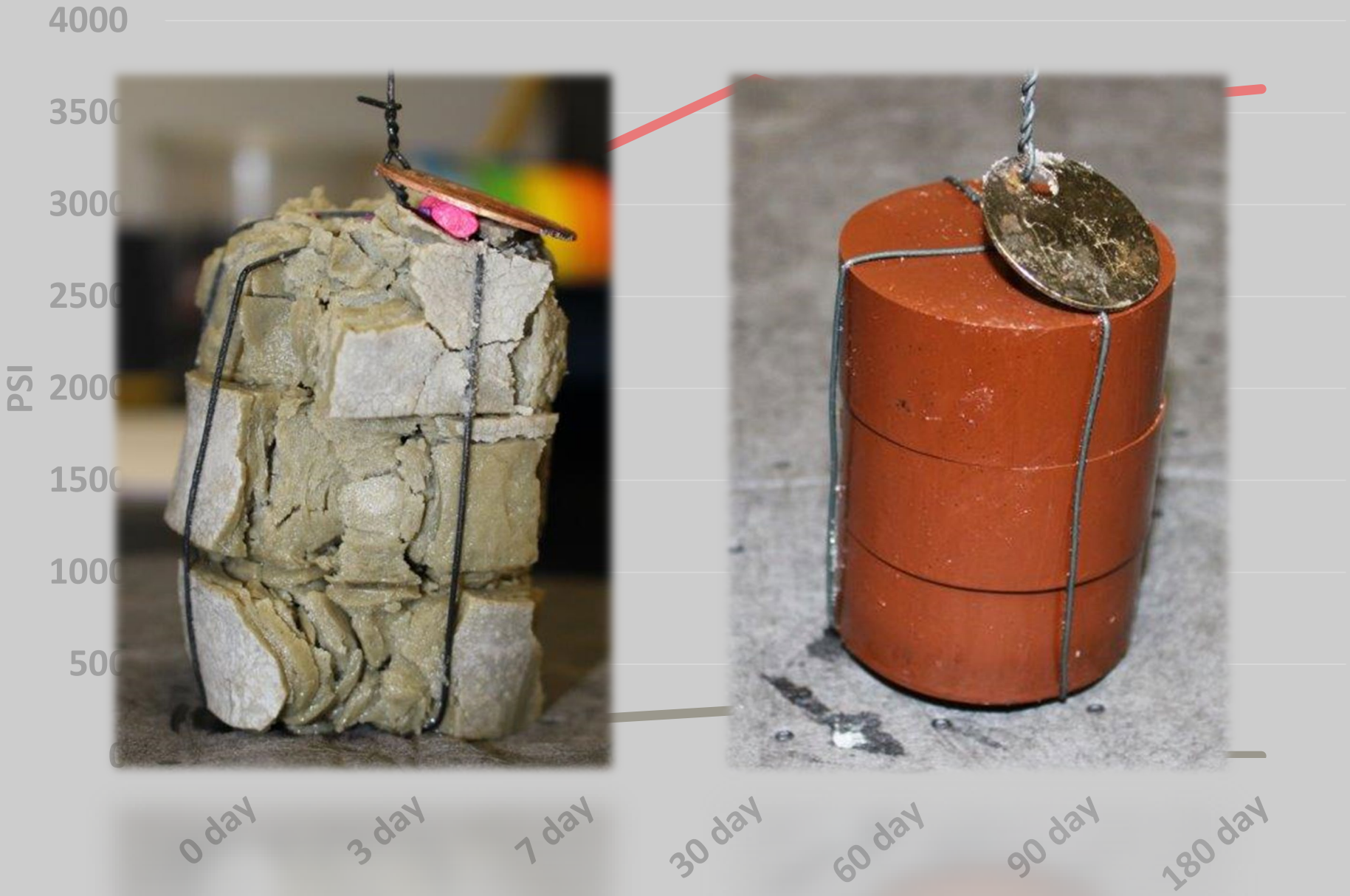



Before
During
After

Solids Free



Tensile Strength in Calcium Bromide



ControlSEAL ED FLUIDS

trolSEAL

11.5 ppg Brine

Innovate

CSI TECHNOLOGIES

Alternative methods to place barrier material

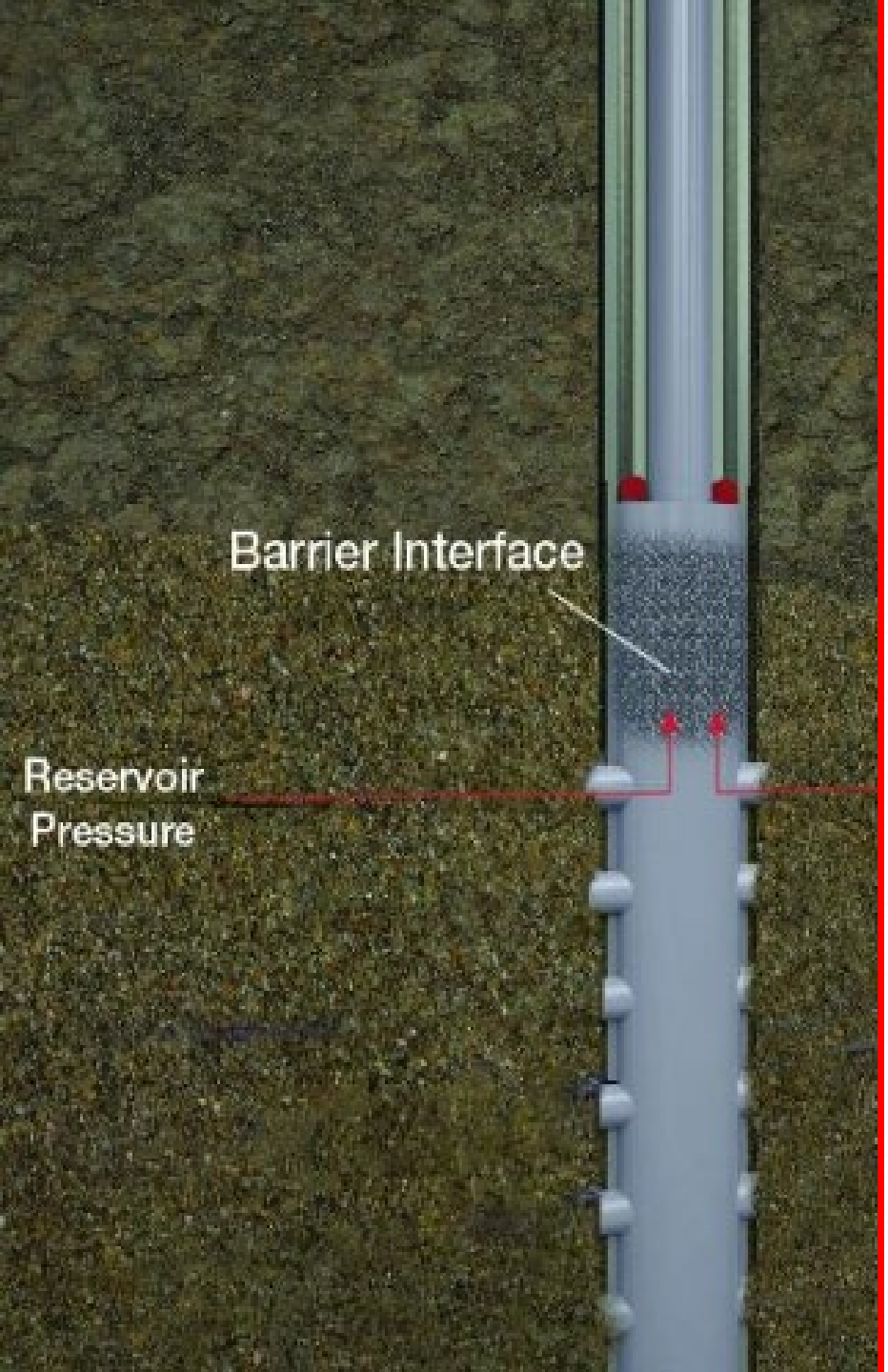
- Limited

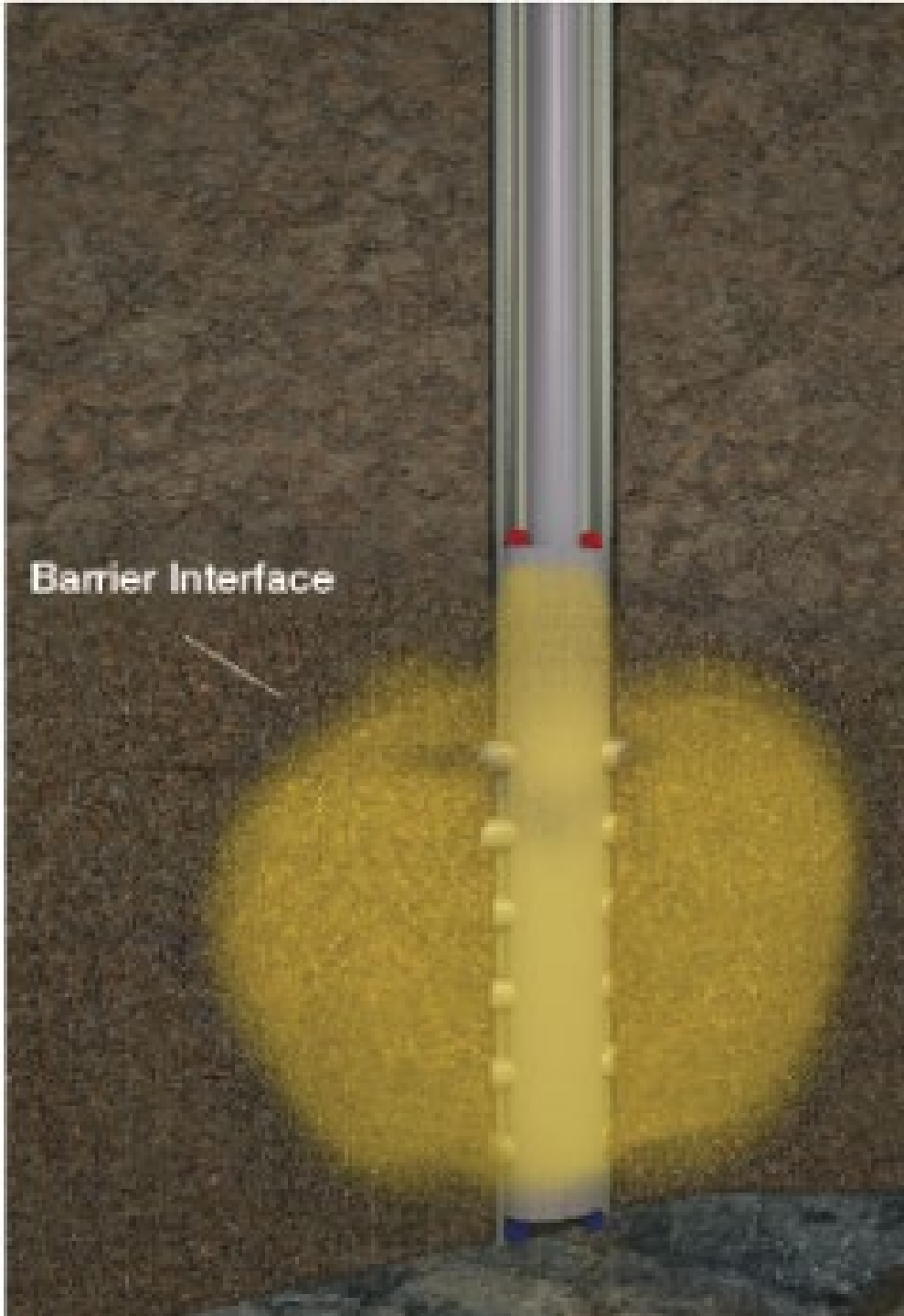
Alternative barrier materials

- Developed

Re-regulate

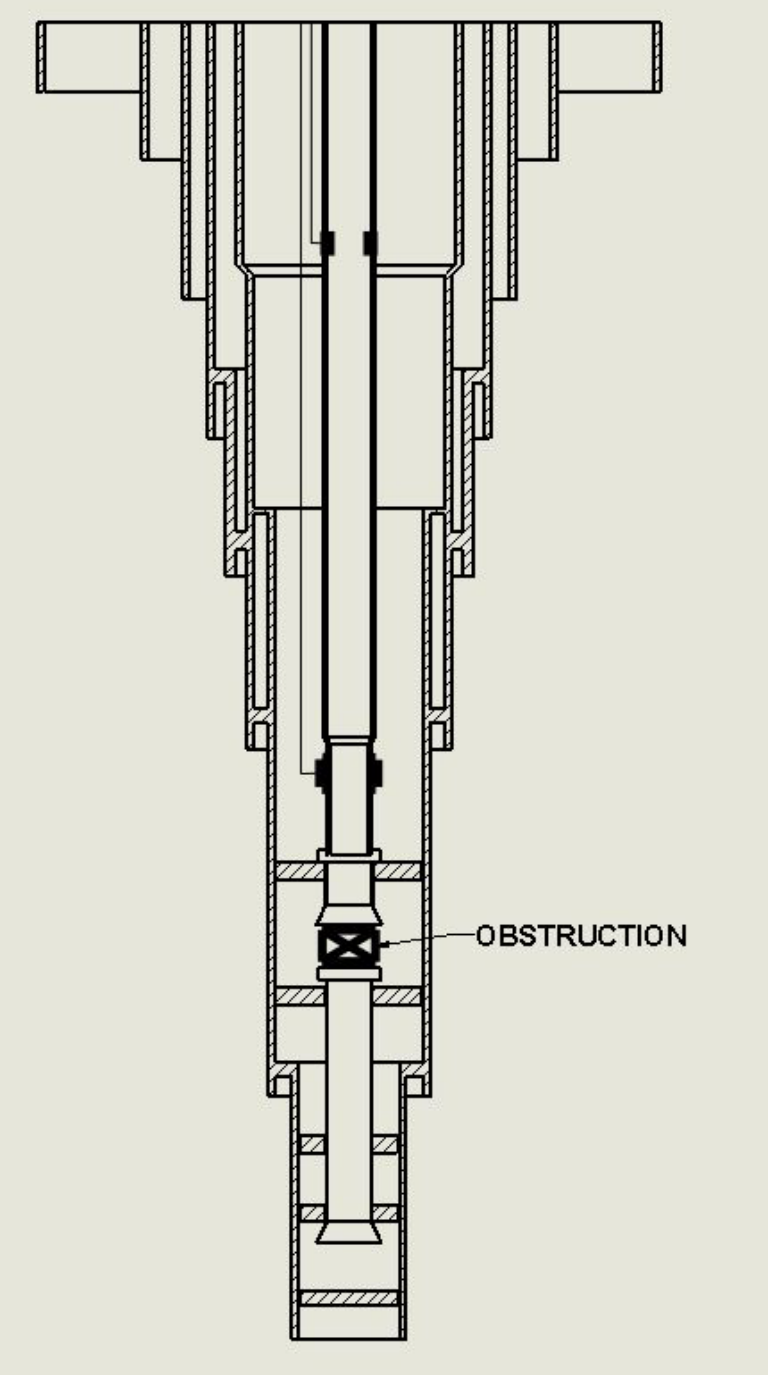
Regulations are currently limited to cement


Barrier Interface
Reservoir
Pressure


Barrier Interface

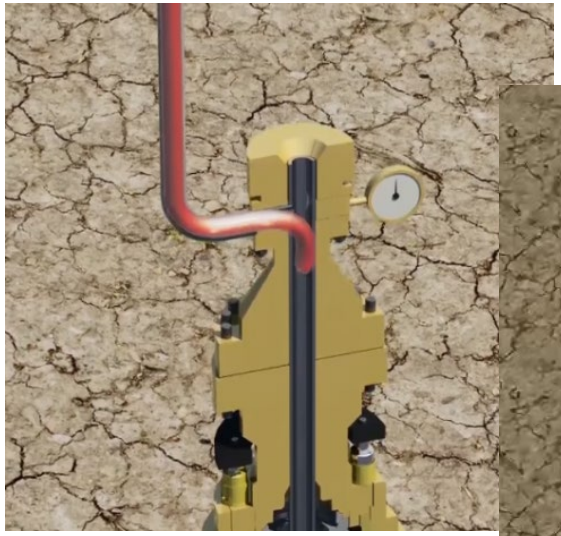
Case Study

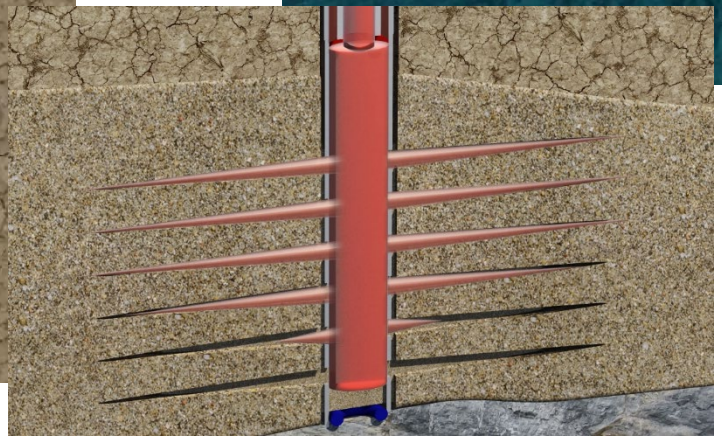
- 13,000 psi wellhead pressure
- BOP use not feasible
- Obstruction in the flow path
- Needed to isolate formation at 30,000 ft MD



The Operation: Abandon

- Pumped 37 bbls of ControlSEAL
- Injected 10 bbls of resin into formation





The Success

- Well killed and pressure isolated
- No Health, Safety, Environmental incidents
- Significant financial benefits for operator
  - **Highest risk well**
- <u>First resin-only approved lower abandonment</u>

Summary

CSI TECHNOLOGIES

The Problem:

- The cost to restore zonal isolation for uneconomic wells

The Solution:

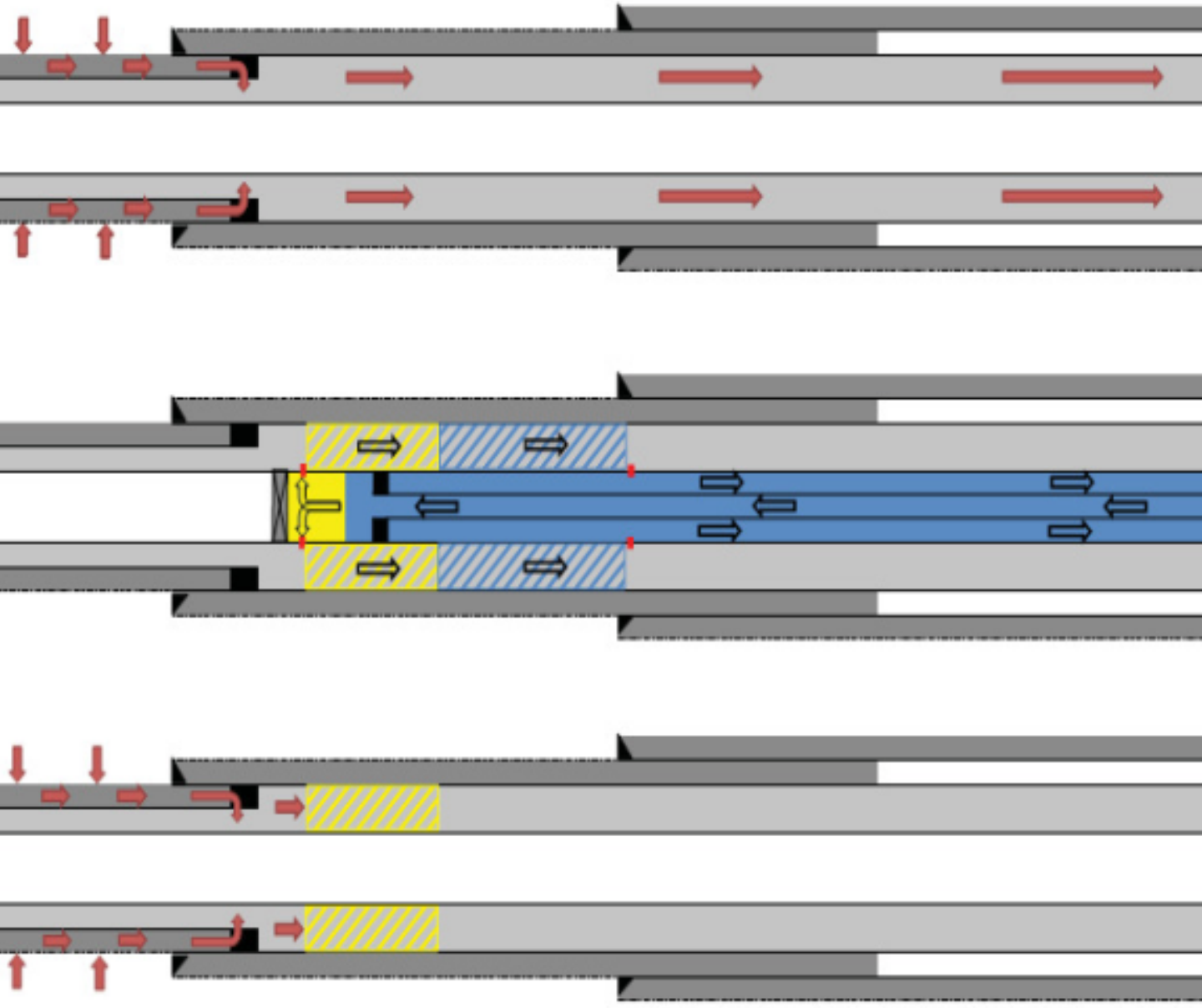
- Lower cost
  - Evaluate
  - Innovate
  - Re-regulate

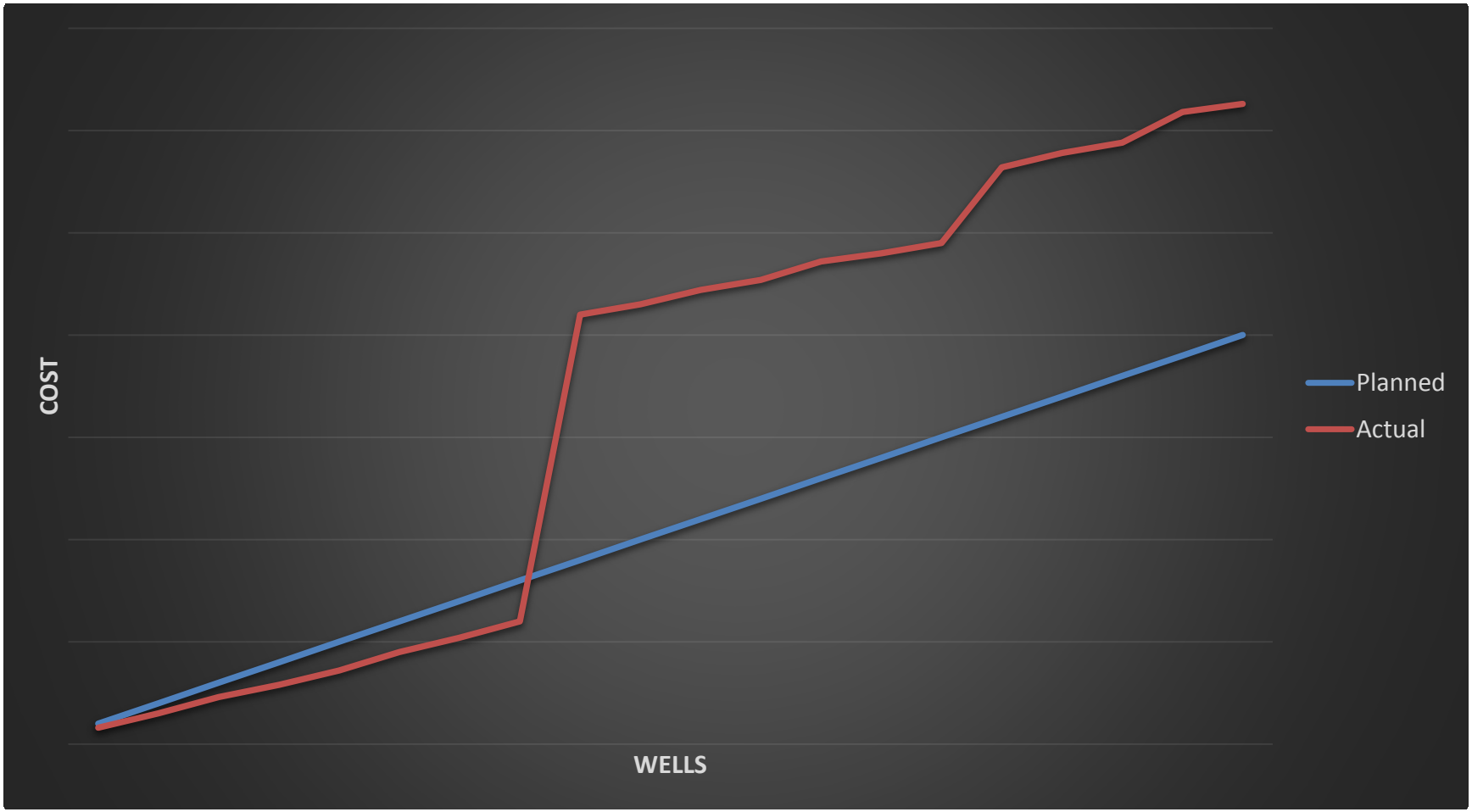
Epoxy Resin is a alternative barrier material that has showed integrity and finical advantages compared to cement

DEVELOPMENT DRIVEN. FIELD FOCUSED.

THANK YOU

www.CSI-Tech.net




COST
WELLS
Planned
Actual