

SPE-157739  
**Single-Well SAGD Field Installation and  
Functionality Trials**

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# Thermal Enhanced Recovery Methods

## Conventional SAGD

- Reduced Steam Pressure
  - Shallow depth, Caprock integrity, Outcrop proximity
- Geological Issues
  - Vertical perm, Shale barriers, Permeable lean zones

## Conventional CSS

- Geological Issues
  - Bottom water, Caprock integrity, Top gas

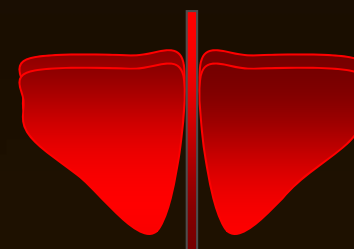
## X-Drain Single-Well SAGD

- Engineer around Geology
  - High permeable propped vertical planes
  - Operate in SAGD mode
- Target Formations – No Recovery Method

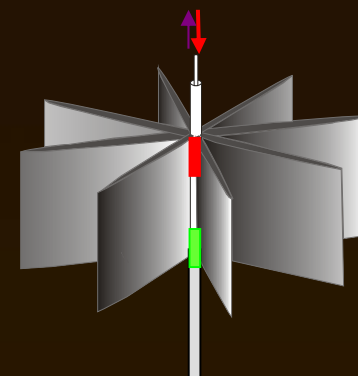
## Conventional SAGD



## Conventional CSS



## Single-Well SAGD



## Shallow Test Well Objectives

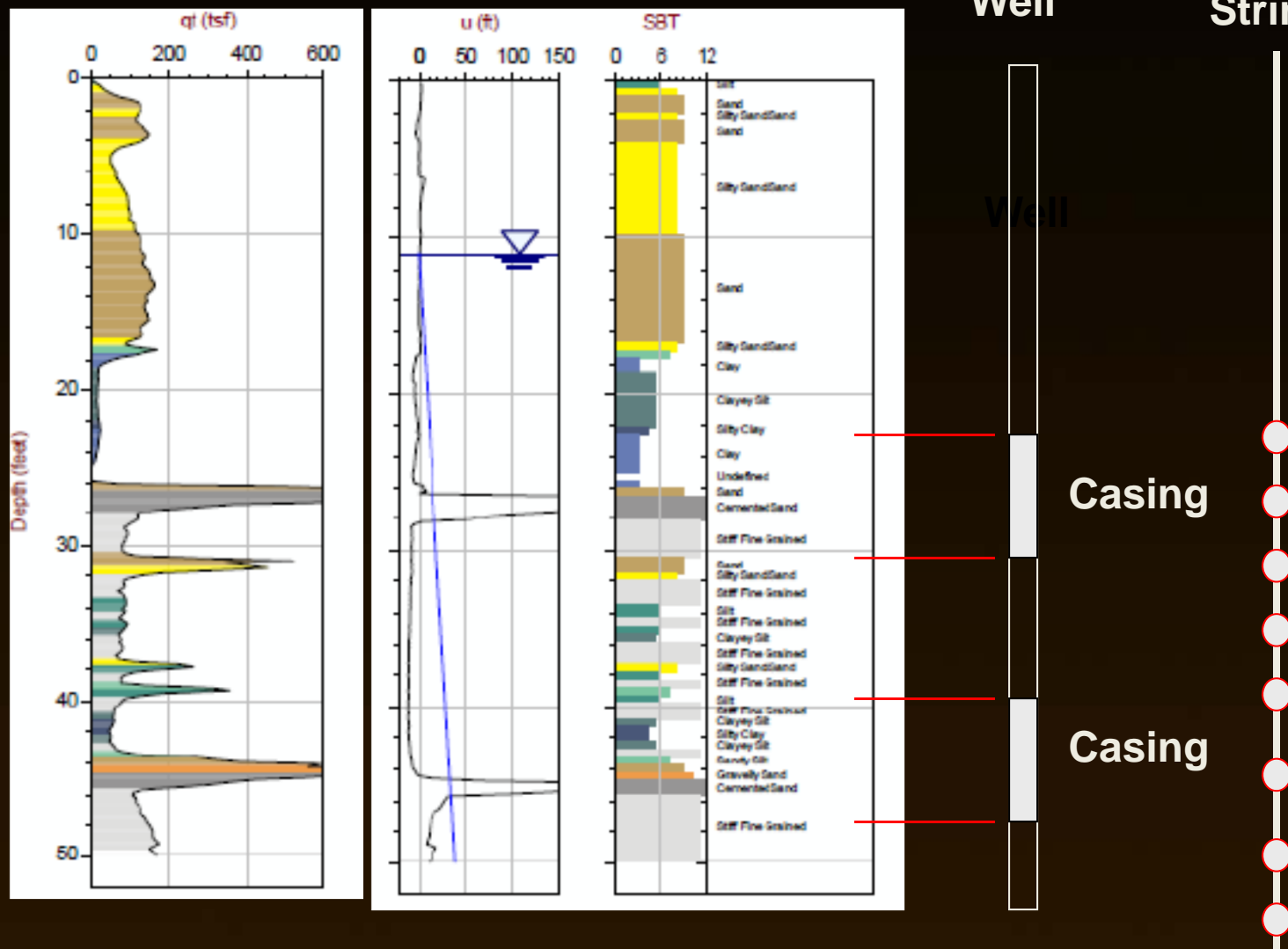
### Primary Objectives:

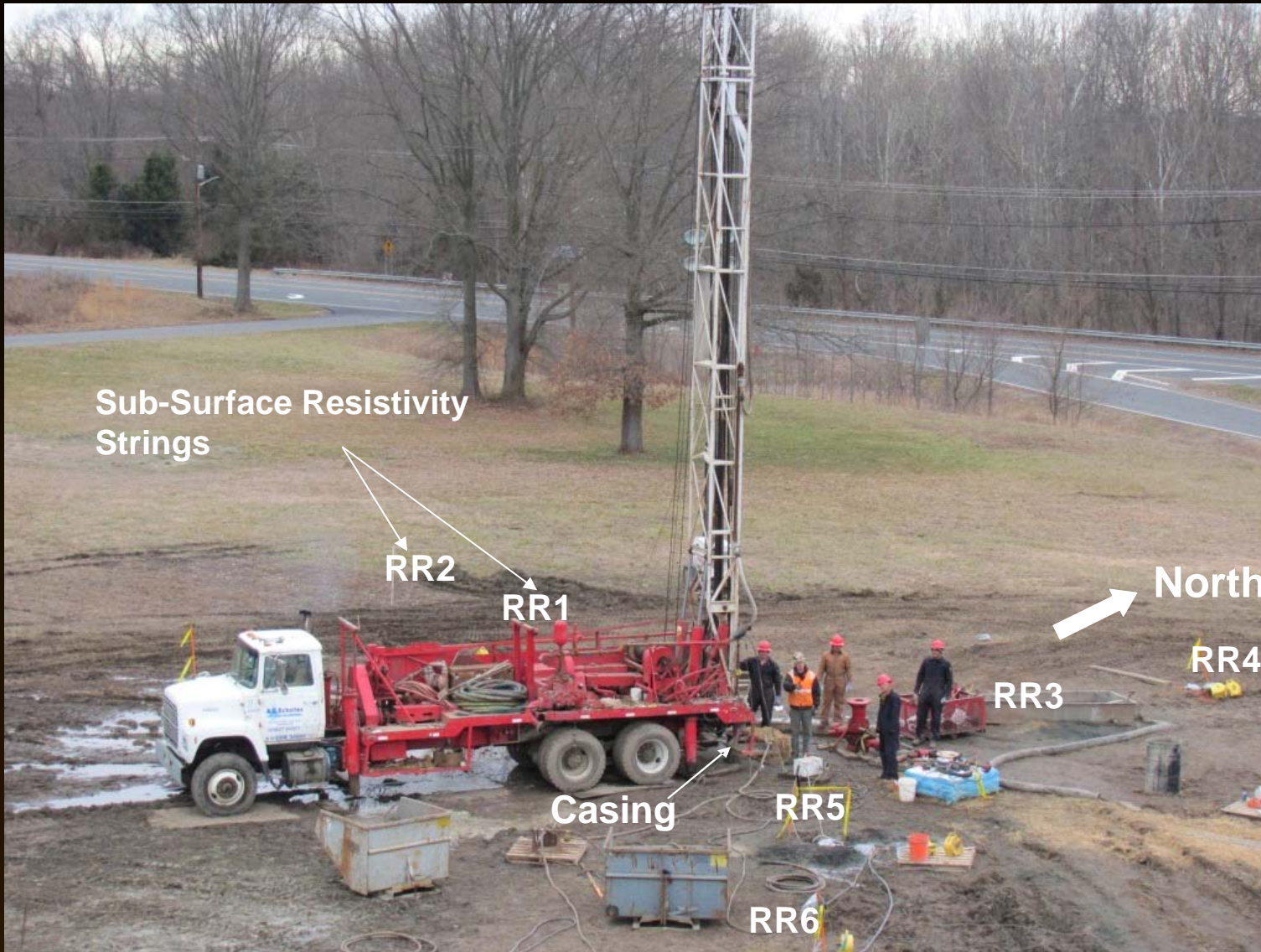
- Mechanical expansion of the casing to the fully locked-open position.
- Independent wing injection of 12/20 proppant without excessive head loss or sanding off.
- Pore-pressure relief for wing coalescence.
- Packer deflation and recirculation procedures to POOH.

### Secondary Objectives:

- Imaging of injected geometry by active resistivity.
  - Quantify plane coalescence by hydraulic pulse interference tests.
  - Observe azimuthal alignment of vertical injected planes  
by surface excavations.

# Resistivity Strings





Sub-Surface Resistivity Strings

RR2

RR1

North

RR4

RR3

Casing

RR5

RR6



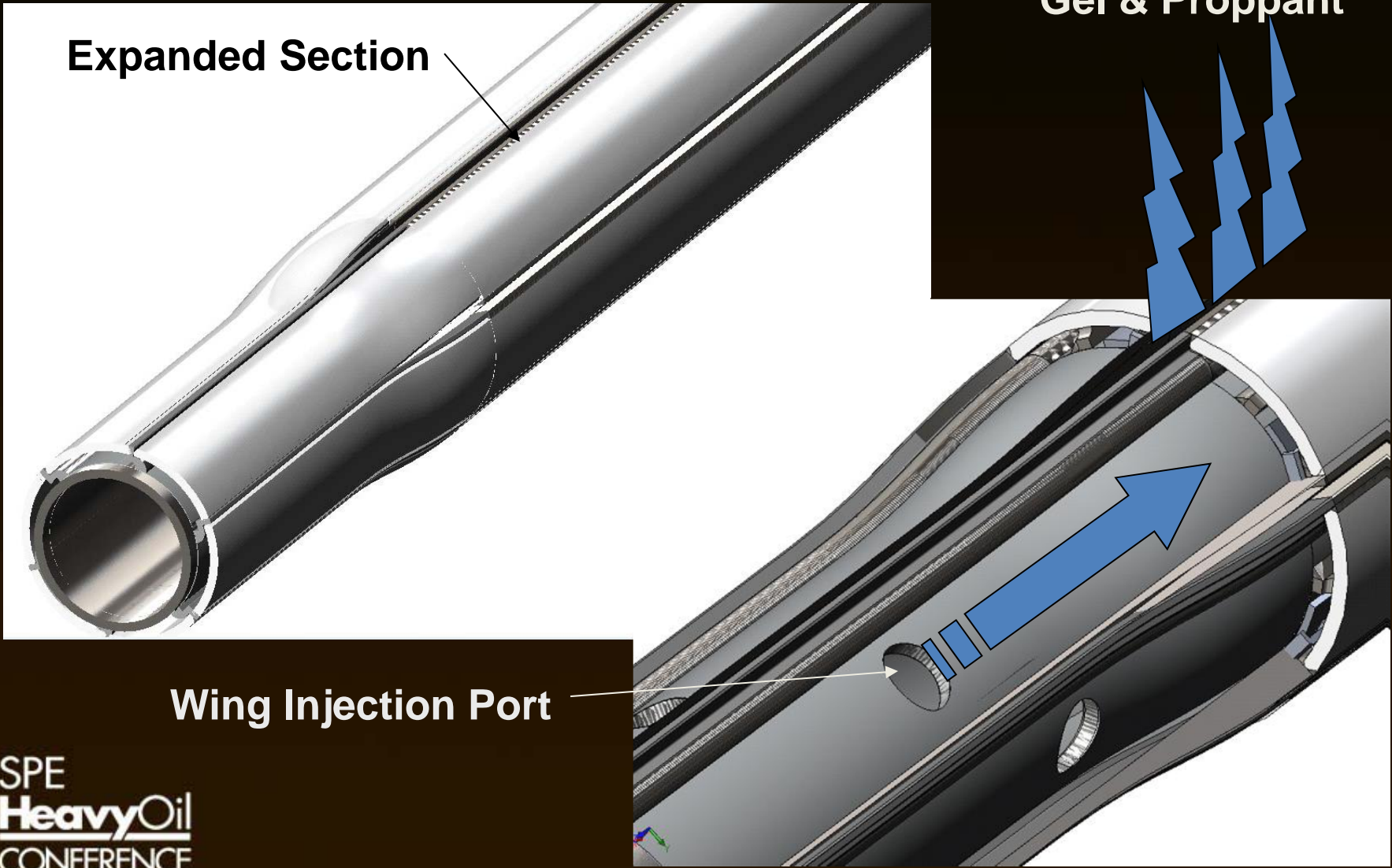
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**Expanded Section**

**Gel & Proppant**

**Wing Injection Port**









Treatment Tool lowered into Well

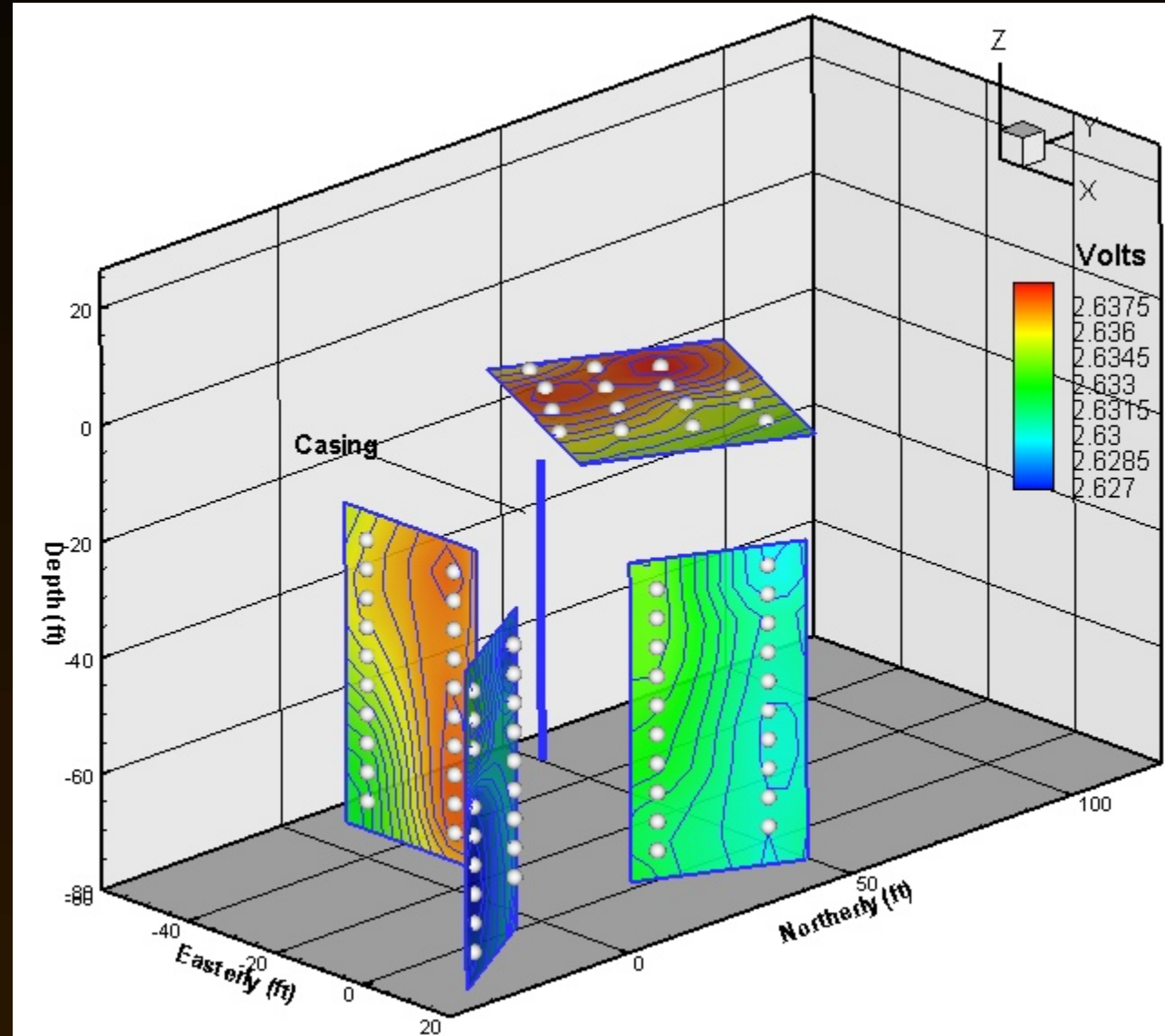


Wellhead installation



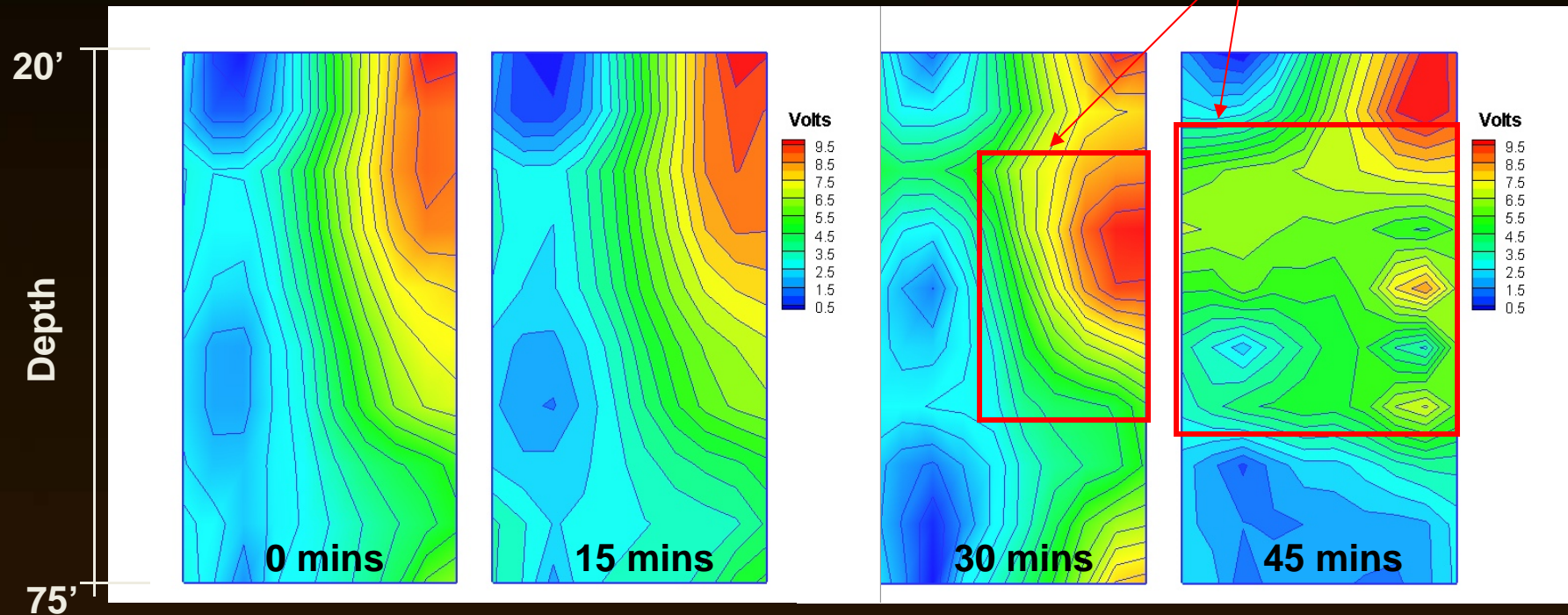
Treatment Tool at full extension

# Active Resistivity Image

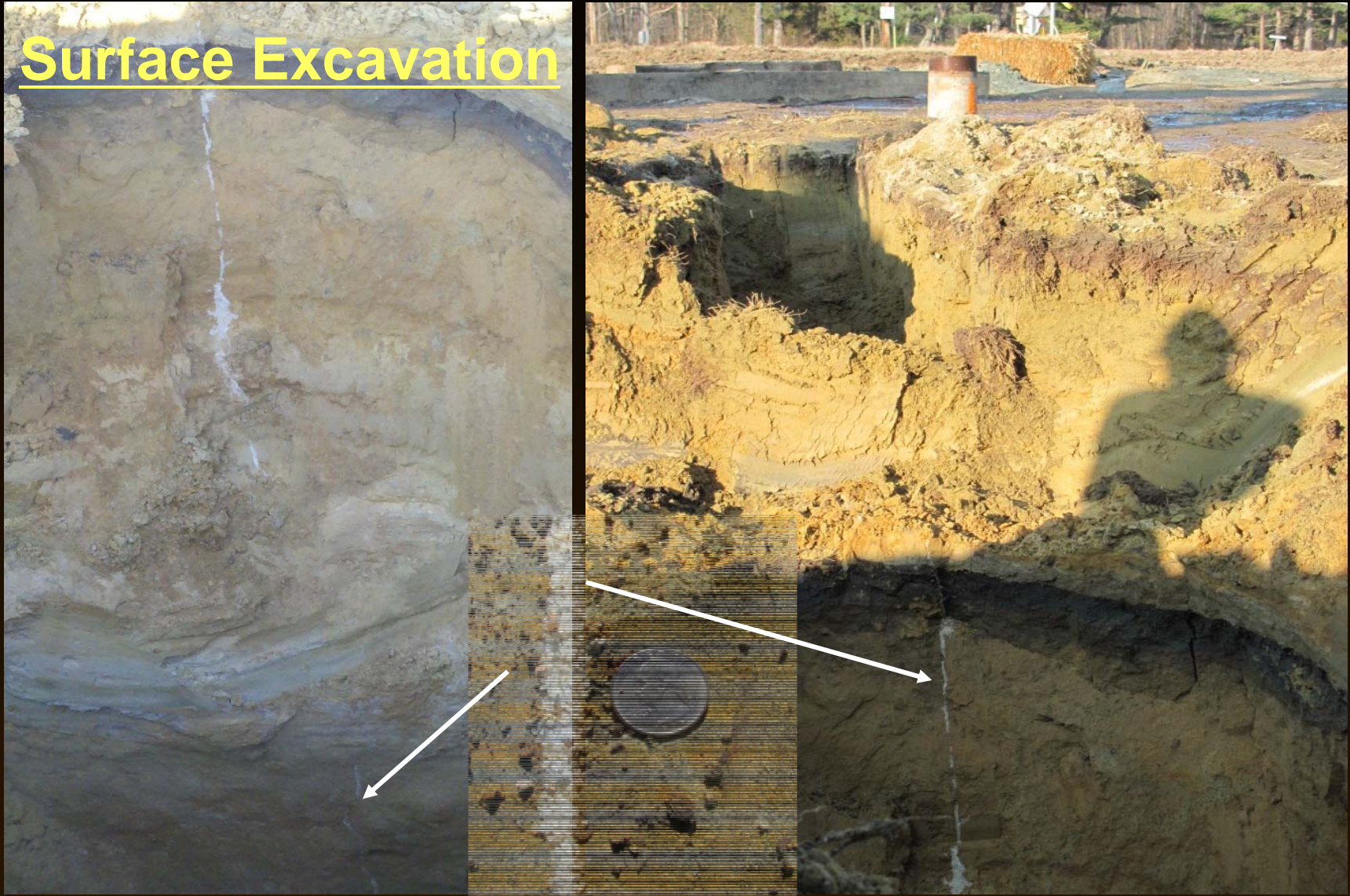


# Active Resistivity Images

Vertical Injected Plane



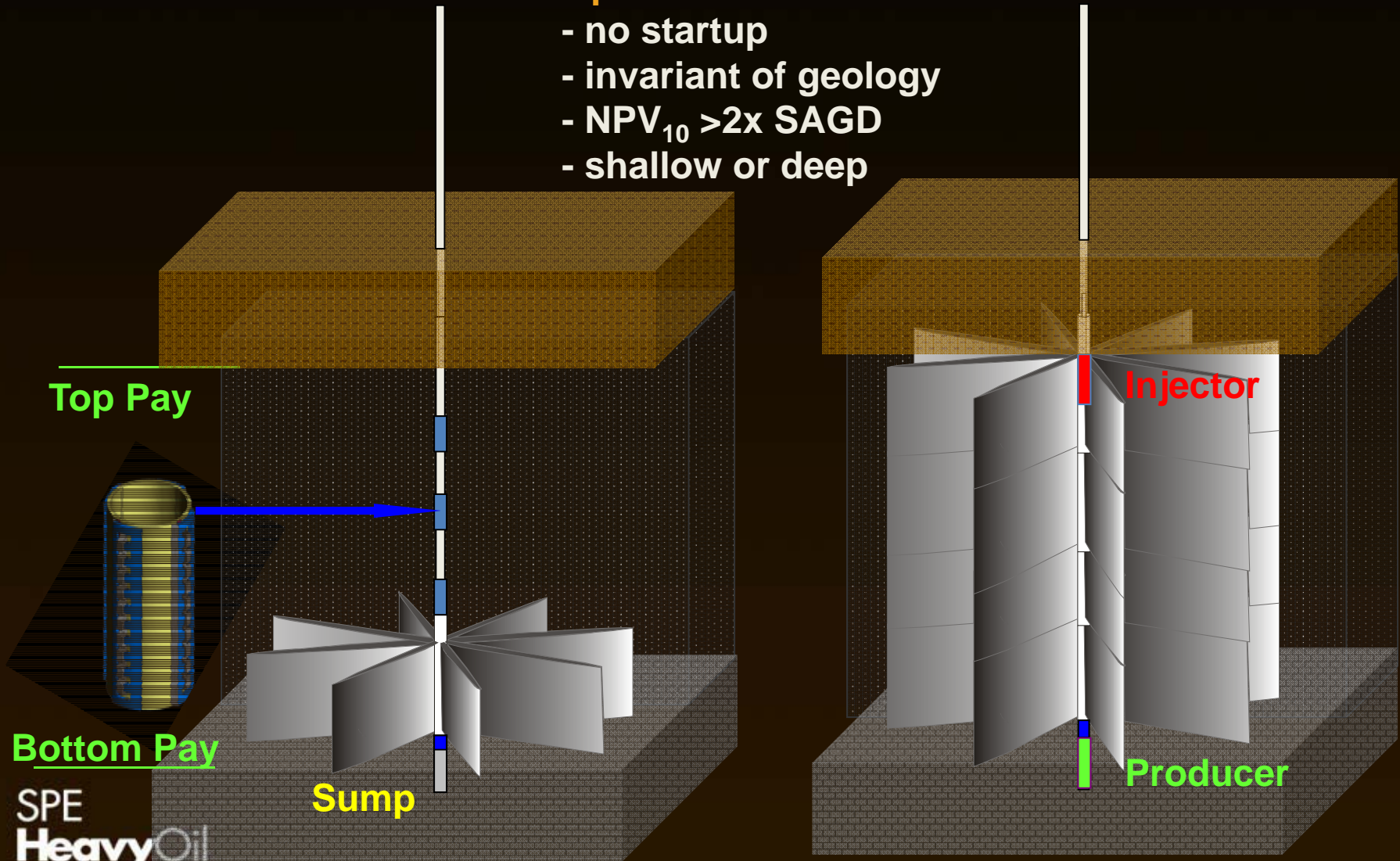
# Surface Excavation

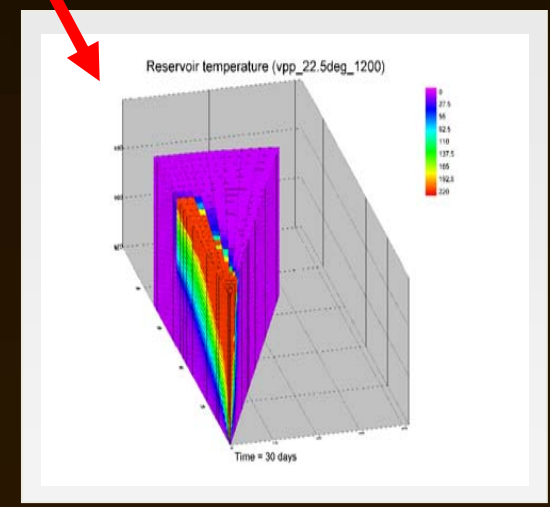
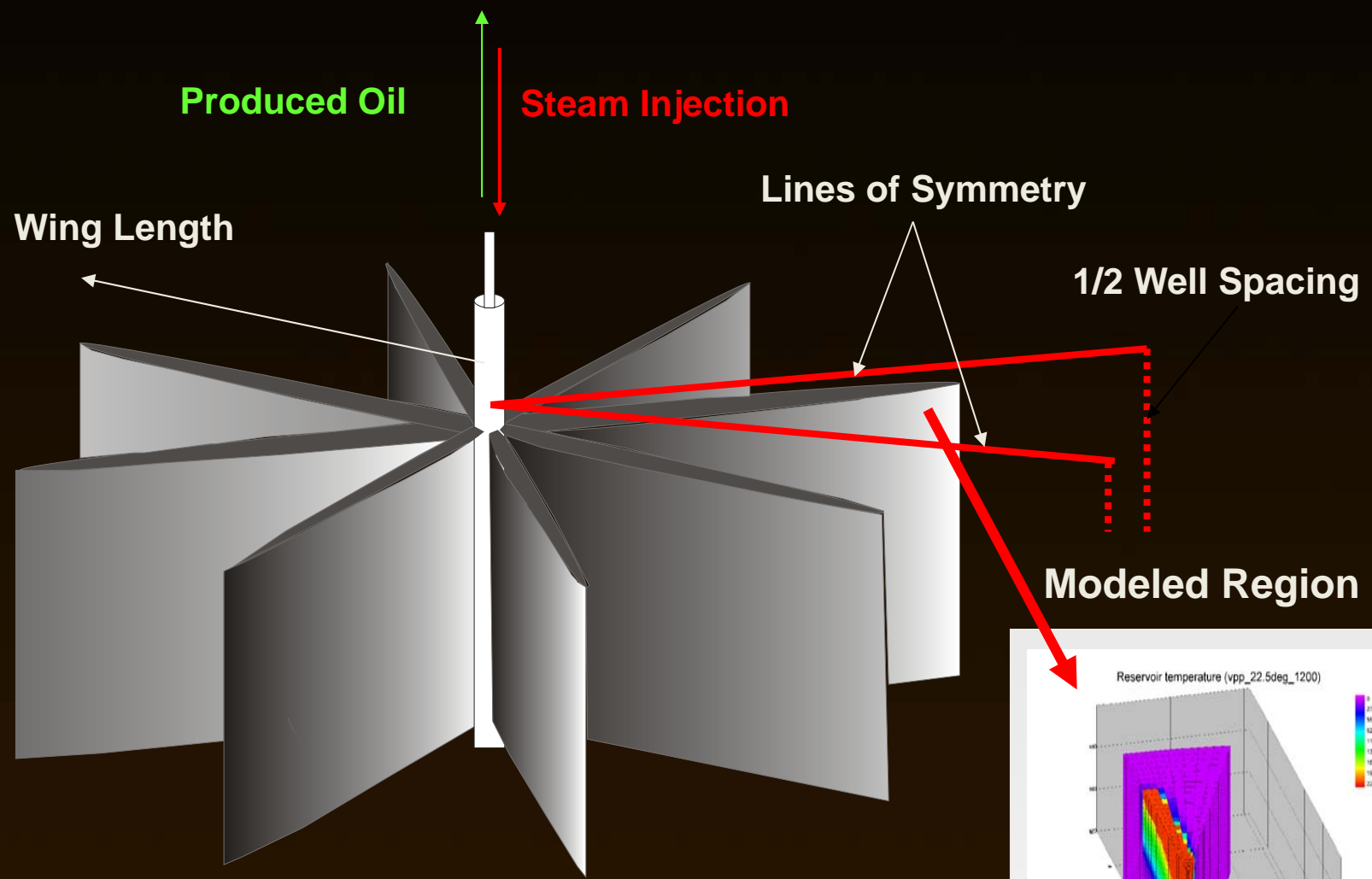


# Single-Well SAGD

## Operated in SAGD Mode

- no startup
- invariant of geology
- $NPV_{10} > 2x$  SAGD
- shallow or deep

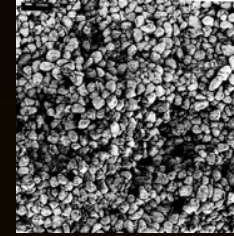
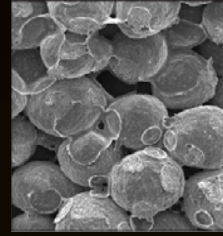




# Single-Well SAGD

Clean Sand

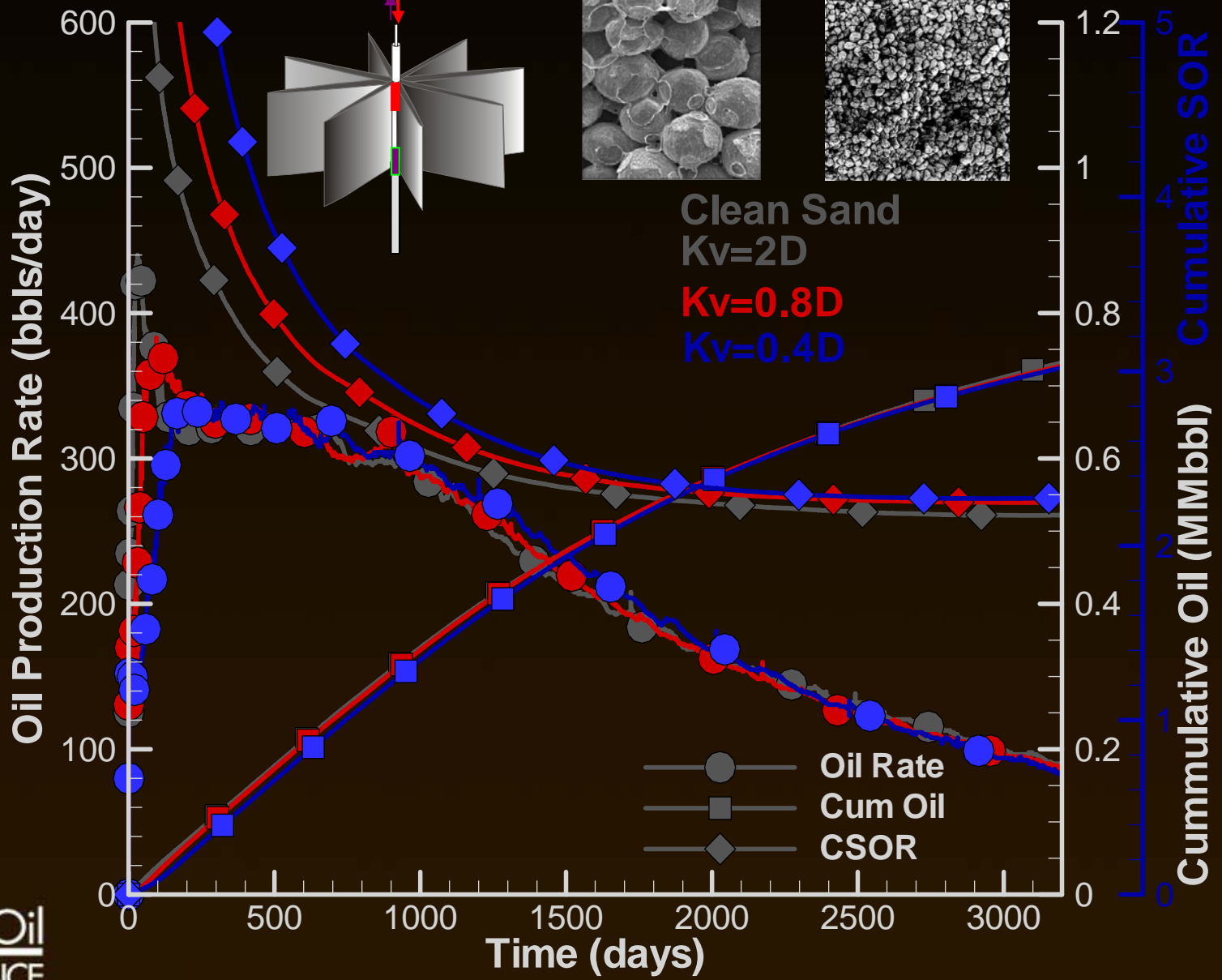
Dirty Sand



Clean Sand  
Kv=2D

Kv=0.8D

Kv=0.4D



# Conclusions

## Test objectives achieved:

- Mechanical expansion of the casing to locked open position
- Independent wing injection of 12/20 proppant
- Enabled pore-pressure relief for wing coalescence,
- Quantified plane coalescence from hydraulic pulse interference tests
- Observed azimuth alignment by surface excavations

## Single-Well SAGD

- If planes constructed thru' full pay height, performance virtually unimpaired by geology



## Acknowledgement

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