



# Weatherford®

## REAL RESULTS

### First Use of ESS® Technology for Gas Storage in Multi-Well Project Achieves High-Rate, Sand-Free Production in California

#### Objectives

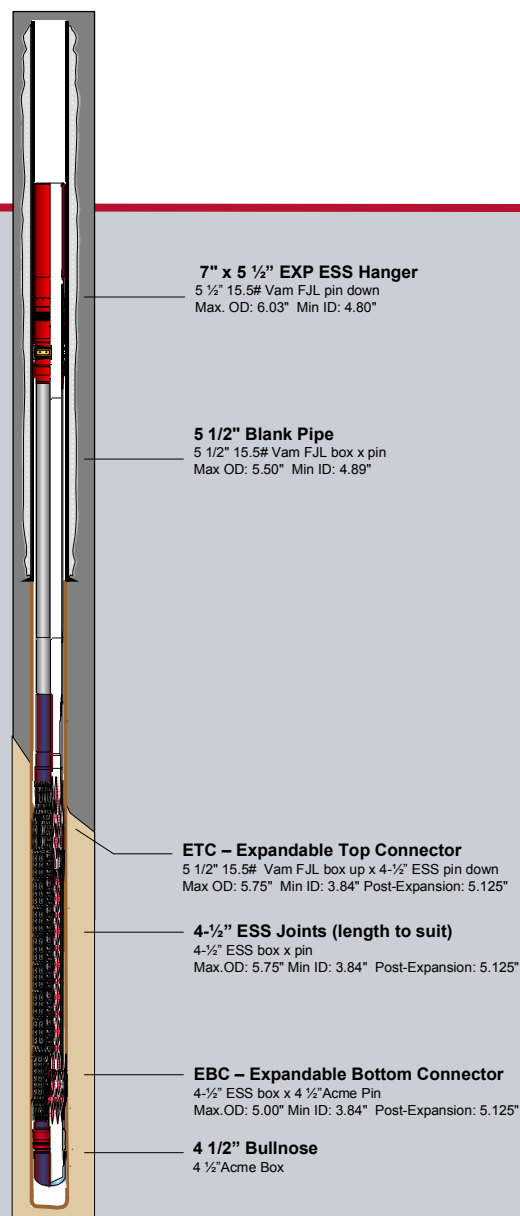
- Provide innovative, reliable sand-control technology to enable the operator to cycle gas injection and withdraw at higher rates than conventional sand-control techniques allow.
- Improve operational efficiency and reduce the risk associated with drilling and underreaming for traditional openhole gravel packs.

#### Results

- A compliantly expanded 4 1/2-in. (approximately 5 1/8-in. ID after expansion) ESS expandable sand screen system was employed to provide sand control, increase flow area, and minimize skin, reducing pressure drop across the completion equipment.
- The ESS system successfully avoided the operational complexity of open-hole gravel-packing and achieved high-rate, sand-free production with minimal completion skin.

#### Value to Client

- By using the ESS system the need for costly rig underreaming operations was eliminated, providing the client with additional time and rig-cost savings.
- The ESS system successfully completed multiple injection and withdrawal cycles with no sand production and withdrawal rates up to 35 million scf/d.



**7" x 5 1/2" EXP ESS Hanger**

5 1/2" 15.5# Vam F.J.L. pin down  
Max. OD: 6.03" Min ID: 4.80"

**5 1/2" Blank Pipe**

5 1/2" 15.5# Vam F.J.L. box x pin  
Max OD: 5.50" Min ID: 4.89"

**ETC – Expandable Top Connector**

5 1/2" 15.5# Vam F.J.L. box up x 4 1/2" ESS pin down  
Max OD: 5.75" Min ID: 3.84" Post-Expansion: 5.125"

**4-1/2" ESS Joints (length to suit)**

4-1/2" ESS box x pin  
Max OD: 5.75" Min ID: 3.84" Post-Expansion: 5.125"

**EBC – Expandable Bottom Connector**

4-1/2" ESS box x 4 1/2" Acme Pin  
Max OD: 5.00" Min ID: 3.84" Post-Expansion: 5.125"

**4 1/2" Bullnose**

4 1/2" Acme Box

#### Location

Southern California, USA

#### Well Type

Onshore gas storage/re-entry sidetrack

#### Hole Size/Angle

6 1/8-in., 29°, openhole

#### Depth

7,650 ft (2,332 m)

#### Hole Length

253 ft (77 m)

#### Products/Services

ESS expandable sand screen system

Weatherford  
Adriana Hightower  
Applications Engineer  
adriana.hightower@weatherford.com

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