



**CHALLENGE**

A customer operates a Cyclic Steam Stimulation (CSS) field with some wells experiencing reduced production due to CaCO<sub>3</sub> scale buildup. The client chose Well #4 on a particular pad for treatment with symptoms that included a  $\Delta P$  of over 1 MPa, 40% plugging on the steam-throttle-joint (STJ) curve, and poor gross production vs DI performance compared to the average. The customer chose WASP<sup>®</sup> for the treatment as there would be no damage to any completion equipment, maintaining well integrity.

**HIGHLIGHTS**

CSS oil field  
HZ drilled  
Location: NE Alberta

**CONDITIONS**

Measured Depth: 2,000 m (6,600 ft)  
Clearwater shale



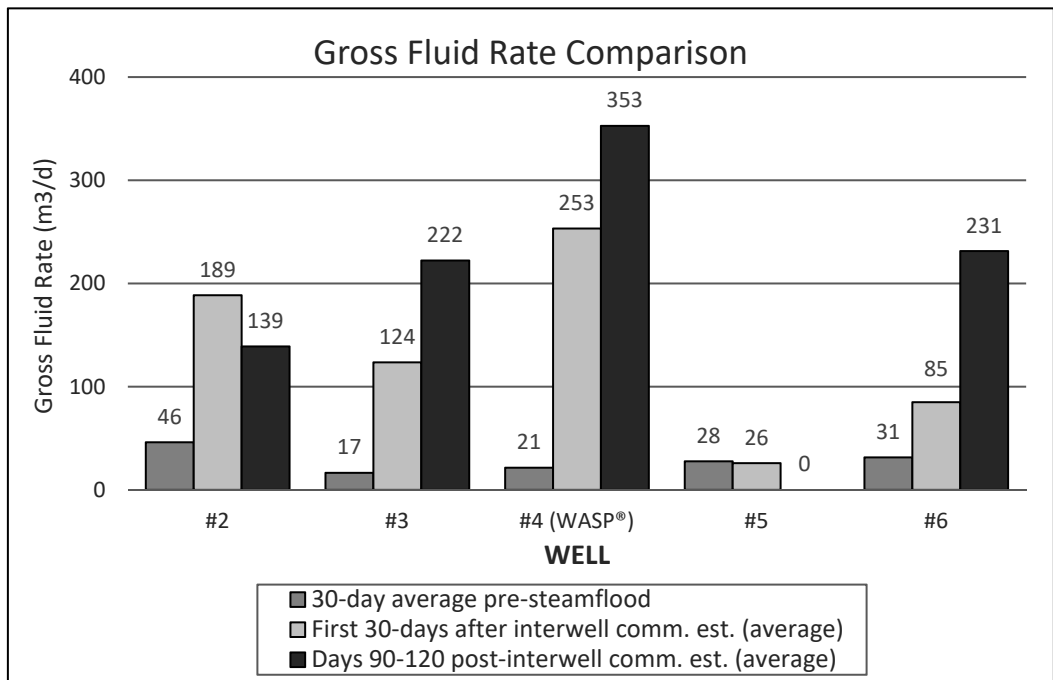
Scale Removal

**OUTCOME**

- Well #4 (WASP<sup>®</sup> treated well) achieved a quicker and higher ramp up in production (graphs on reverse side)
- After factoring in flush production and incremental fluid production due to reservoir pressure communication, the client calculated there was an additional 60 m<sup>3</sup>/d of sustained gross fluid production for Well #4 vs the other wells on the same pad
- Well #4 had a 90% higher rate in the first 3 months vs the other wells ^^, and a 79% higher rate in the 90-120 day post interwell communication established period

WASP<sup>®</sup> treated well has 90% higher production vs non-treated wells

^^ Average, not including well #5



**SOLUTION**

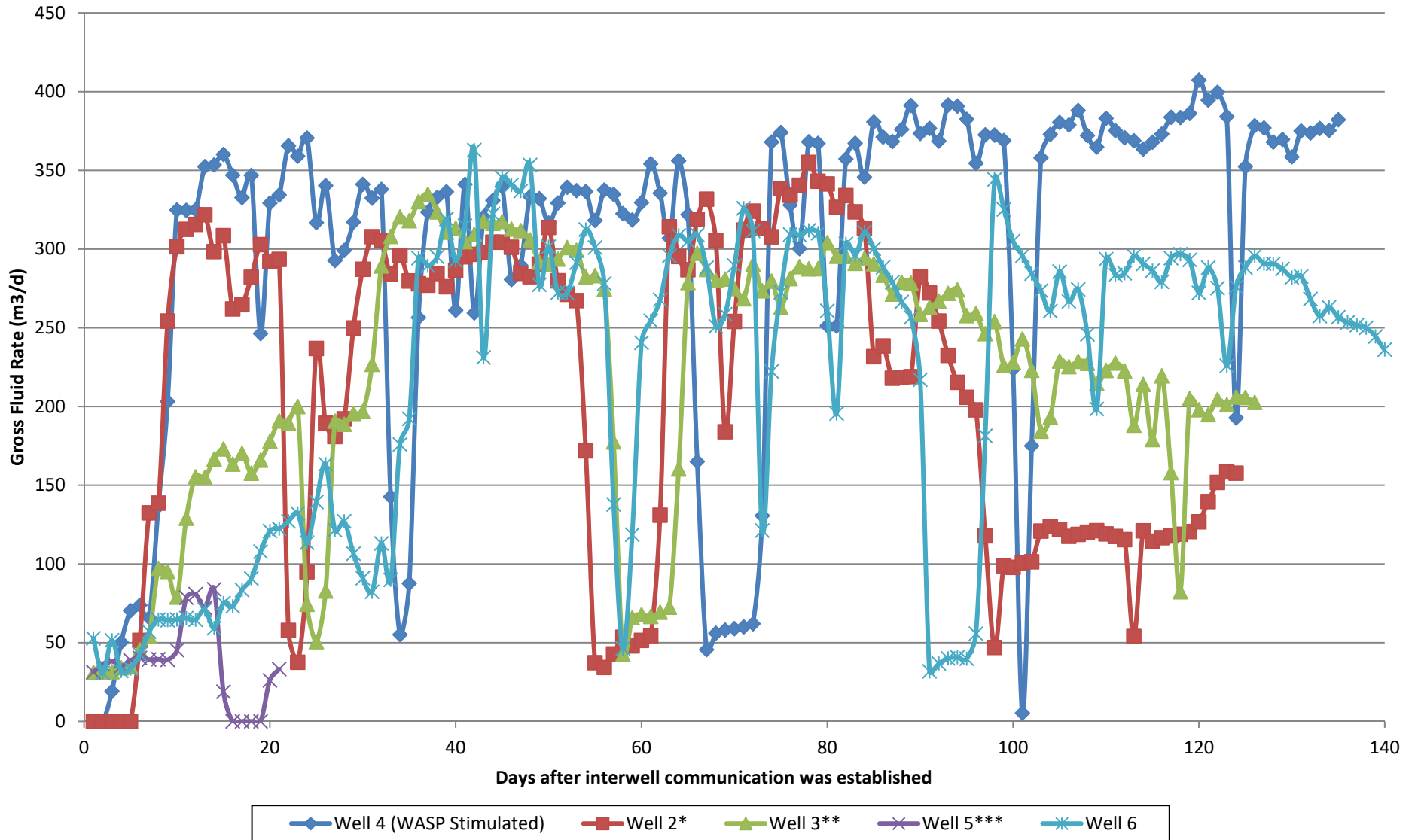
Improve connectivity to the reservoir by removing CaCO<sub>3</sub> scale and clearing out blockages using electro-hydraulic stimulation technology

- Well #4 was cooled by pumping warm water down the liner to cool the wellbore to below 130 °C
- The Blue Spark WASP<sup>®</sup> 275 (Wireline Applied Stimulation Pulsing) tool was conveyed on third-party e-Coil to the toe of the wellbore
- There were 21 distinct intervals of 1.0 m treated as the toolstring was pulled up the wellbore towards the heel
- The field was then switched from CSS to steamflood, and Well #4 was monitored, along with 4 other wells on the same pad that were not treated with WASP<sup>®</sup>





### WASP Stimulated Well vs Unstimulated Wells during Steamflood



\*Well 2 saw steam breakthrough from neighbouring injector shortly after day 80 resulting in decreased production  
 \*\*Well 3 had some pump jack torque issues from day 40-60  
 \*\*\*Well 5 had a casing failure and was suspended at day 20

Data and graph provided by client