

### CHALLENGE

Client has a small field in which most wells develop barium sulfate scale (BaSO4). The BaSO4 scale can build very rapidly, resulting in reduced production. The scale in the tubing can be cleaned with a bit-and-scraper run, but the scale in the perforation tunnels is not removed during this procedure. The client wanted to try another method to remove the scale in the casing, as well as attempt to remove scale in the perforation tunnels.

#### HIGHLIGHTS

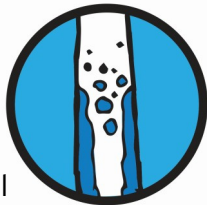
Conventional oil well  
Vertically drilled  
Artificially lifted

#### LOCATION

Permian Basin, USA

#### CONDITIONS

Depth: 5,200 ft (1,600 m)  
Sandstone formation

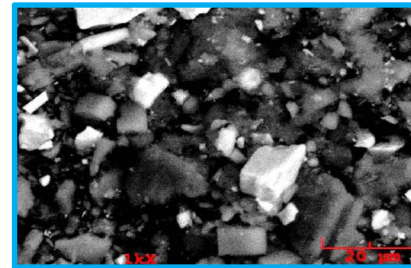


Scale Removal

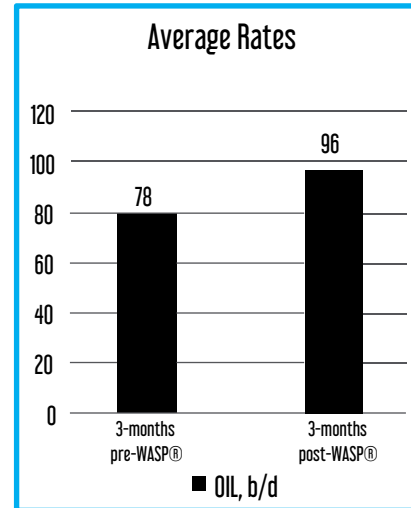
### OUTCOME

- The client ran back in the wellbore with tubing and discovered that the WASP® had created 11 feet of fill (in 7 inch casing)
- An analysis of the fill determined the presence of silica and clay, along with the BaSO4, confirming that the perf tunnels had been cleaned
- Oil production increased from 78 b/d to 96 b/d (23% increase)
- Water production decreased 11%

COMPONENT	CONC.	
BaSO4	30.737	Barium Sulfate
SiO2	19.750	Silica
Al2Si2O5(OH)4	17.668	Kaolinite (clay)
NaCl	15.637	Sodium Chloride
FeCO3	6.890	Iron Carbonate
CaCO3	7.193	Calcium Carbonate
MgCO3	2.124	Magnesium Carbonate
TOTAL	100.000	



**BaSO4**  
was removed from casing and perforations;  
Oil increased **23%**



### SOLUTION

Remove scale and improve connectivity to the reservoir using electro-hydraulic stimulation technology

- In conjunction with a workover, the tubing and bottom hole assembly were pulled
- The well was cleaned with a bit-and-scraper before running WASP®, with all debris cleaned from the sump
- The WASP® (Wireline Applied Stimulation Pulsing) was deployed into the wellbore and 3 zones of perforations were treated, for a total of 52 feet