Case Study

PIC

Wells on Gulf of Mexico Shelf Returned to Economic Health with SoleAcid

SITUATION ANALYSIS

GoM Shelf operator had a large inventory of wells that were no longer economically feasible with current low crude pricing. Also, high quality, conventional stimulation treatments had recently failed to maintain the production increase for more than a few days.

OBJECTIVE

Applied advanced analytics to determine if wettability reversal or organic deposition was occurring. Measured ionic composition of produced water and crude carbon numbers over a short time interval. This allows analysis of the delta/changes and should show what is the likely plugging agent(s), state of wettability, and range of treatment options. Further verification of the composition and size of damage mechanisms would be determined by polarized microscopy from extracted produced solids.

SOLUTION

PIC conducted laboratory testing which showed that these wells were producing large oil-wet silica fines averaging 60 microns in size. Because of the oil wet conditions, many of these fines, normally producible through the sand control screen, were becoming trapped in the screen and perforations. Conventional aqueous acid systems are ineffective at removing oil coating barriers to dissolve the silica fines plugging the near wellbore. SoleAcid is a single stage, kinetically controlled, azeotropic fluoroboric acid, which is more economical, has much lower risk, and is compatible with virtually every reservoir fluid and sandstone mineralogy.

TREATMENT PROCEDURE

1. 500 gals of hybrid solvent preflush

- Removes rigid film emulsions and organic deposits that have stabilized in the tubing before being bullheaded into the formation.
- De-oil silica fines and separate reservoir fluids from SoleAcid

2. 500 gals SoleAcid preflush designed to dissolve or lock fines in place displaced by untreated produced water bullheaded from the tubing.

3. 500 gals of an azeotropic brine spacer. Displaces SoleAcid deeper into the reservoir. Behaves more like a hydrocarbon to mitigate additional fines movement.

4. SoleAcid placed in the near wellbore at 25 to 50 gpf depending on magnitude of damage and zone length. Azeotropic condition keeps fines in place to be removed in the screen and perforations. The kinetic control results in a slow release of HF acid up to 5% HF acid. Nanosurfactants and penetrants continuously strip oil coatings from silica fines to optimize damage removal.

RESULTS

These results shown in Table 1 are 90 days after the SoleAcid treatments.

Well 1					
BOPD	BWPD	MCFD	FTP	Choke	
90	438	66	195	96/64”	Before SoleAcid
413	1,306	229	403	40/64”	After SoleAcid
Well 2					
BOPD	BWPD	MCFD	FTP	Choke	
104	82	217	144	96/64”	Before SoleAcid
392	520	548	505	41/64”	After SoleAcid

Table 1.