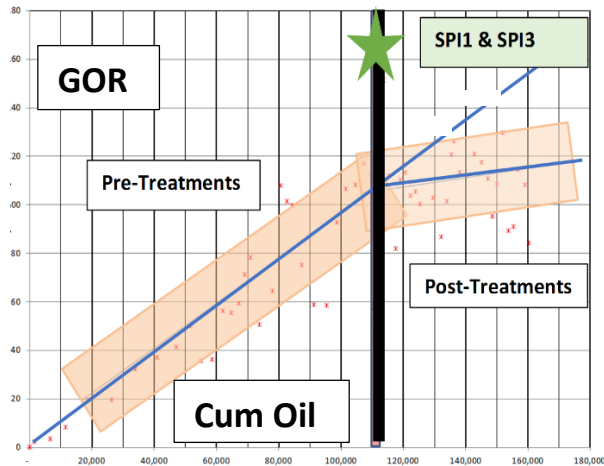


## SPI Development History

- 2005-06 SWC project for SPI chemistry & waterflood field tests;
- 2006-08 OCAST project for casing repair;
- 2008 SPE paper #113490, "New Generation Silicate Gel System for Casing Repairs and Water Shutoff";
- 2009 DOE SBIR project-new SPI initiators;
- 2011-14 DOE CO<sub>2</sub> projects for field tests;
- 2011-14 DOE SBIR- long delay initiators;
- 2014 SPI patent USPTO #882238;
- 2011-2015 DOE EERE (at CTI) project for high temperature internal initiators and gels;
- 2016 SPE paper #179615, "Field Test Results of a New Silicate Gel System that is Effective in CO<sub>2</sub> Enhanced Recovery and Waterfloods"



## Field A, Well 1 Offset Response Pattern Cum Oil vs GOR



## SPI Treatment Case Histories in CO<sub>2</sub> and Water Floods

Injector Treatments						Pre-Treatment Status				SPI Treatment		Injectivity Reduction (% of PreTreatment)		
SPI #	Well #	State	Well Type	Rock Type	Depth	Rate BPD	WHP	Injectivity	Interwell	Mo/YR	BBLs	3 mo.	12mo.	24 mo.
						MMCFPD	PSIG	Rate/PSI	Cap- BBLs					
SPI1	1	cMS	INJ-CO <sub>2</sub>	sstone	5102	11	1400	7.9	>20,000	Nov-12	950	28%	re-treated	na
SPI3	1	cMS	INJ-CO <sub>2</sub>	sstone	5102	8.26	1500	6.0	>20,000	Feb-13	3842	57%		
											4792	CO <sub>2</sub> Overall=		58%
SPI4	3	wTX	INJ-CO <sub>2</sub> -WAG	dolo	5020	1.0	2350	0.43	400	Sep-13	130	47%	re-treated	na
SPI6	3	wTX	INJ-CO <sub>2</sub> -WAG	dolo	5020	0.5	2200	0.23	400	Sep-13	225	15%		
											355	Overall CO <sub>2</sub> & Water=		10%
SPI5	4	wTX	INJ-CO <sub>2</sub> -WAG	dolo	5020	0.92	2371	0.39	2800	Sep-13	705	9%	Evaluate ReTreat	
SPI8	4	wTX	INJ-CO <sub>2</sub> -WAG	dolo	5020	0.84	2365	0.35	2800	Oct-13	0	23%		
											705	Overall CO <sub>2</sub> & Water=		No Chg
SPI7	5	wTX	INJ-Water	dolo	5020	600.0	1250	0.5	5500	Oct-13	1029	CO <sub>2</sub> Injectivity- NA Water Injectivity 50% lower*		
SPI9	6	wTX	INJ-CO <sub>2</sub> -WAG	dolo	5020	1.75	2075	0.84	17500	Nov-13	3265	CO <sub>2</sub> Injectivity- No Chg Water Injectivity- 50% lower*		
SPI10	7	cOK	INJ-Water	sstone	1735	400	0	vacuum	unknown	Dec-14	200	Plug Thief Zone, Profile Chg		
SPI11	8	cOK	INJ-Water	sstone	1270	1375	0	vacuum	unknown	Aug-15	279	Water Profile Change Only		
Producer Treatments						Pre-Treatment Status				SPI Treatment		cum Oil BBLs over Prior Trend		
SPI #	Well #	State	Well Type	Rock Type	Depth	Oil BOPD	GOR	Oil Trend	GOR Trend	Size- BBLs	3 mo.	12 mo.	24 mo.	
SPI2	2	cMS	PROD	sstone	5102	20	450	-78%/yr	+700%/yr	4349	-	750	6,600	
						CO <sub>2</sub> Flood						Well Shut-in prior to treatment due to excessive GOR		
											-64%	flat	flat	

## Field A, CO<sub>2</sub> Injection Well #1 - Rate/ Pressure Response

