

# Oil Production Increases in Paraffin-rich Kansas

## TOOL INSTALLATION PROGRAM

A small independent Mid-Continent producer installed the Enercat™ Downhole Tool in 22 of their Kansas stripper wells between April 2019 and September 2021. The wells were experiencing ongoing paraffin deposition causing interruptions to production and costs associated with the need for recurrent hot oiling and chemical treatments. The Enercat™ tools were not installed for the purposes of a trial; the company was already satisfied with the efficacy of the Enercat™ Tool in producing their medium light paraffin-rich crude oils. As such the company did not monitor the post-Enercat crude oil production in the weeks following installation of each of the tools but instead measured the production in all 22 wells in March of 2022. Some of the wells therefore produced for more than two and half years after tool installation and most wells produced for more than one and a half years before their production rates were measured.

## RESULTS

The results of the Enercat™ tool installations were highly successful and despite the long delay in measuring the production performance of each of the wells, eighteen of them were still producing above the commencement rate, two remained level and two wells were marginally lower. The overall production increase was 39.3 BOPD or 39.3% higher. These results represent the minimum benefit of the production increases because all wells naturally decline over time and production rates shortly after tool installation would undoubtedly have been much higher.

## COMPANY'S SUMMARY

The company provided a general summary of the results of the installation program: In addition to the revenue from production increases, the wells produced free of paraffin deposition and all chemicals and outside interventions were discontinued.

- Cost of the Enercat™ tools for the 22 wells was approximately \$130,000
- The company realized more than \$1,000,000 in oil sales revenue due to production increases.
- Operating costs were significantly reduced.

## DISCUSSION

Because oil field production declines naturally it is possible to approximate what production rates of the 22 wells would have been shortly after tool installation by understanding the decline rate of the fields from which they produce. The vast majority of the Enercat™ installed wells produce from the Bemis-Stutts and Hugoton fields. The production decline at Bemis-Stutts field averaged 6% per annum from 2013 to 2021 and 14% at Hugoton field. Taking the average production decline of both fields gives a 10% annual production decline.

Applying this average annual decline enables a reasonable back calculation of what each well was probably producing shortly after installation of the Enercat™ tool. On this basis, the overall production increase was 68.3 BOPD or 66% higher.

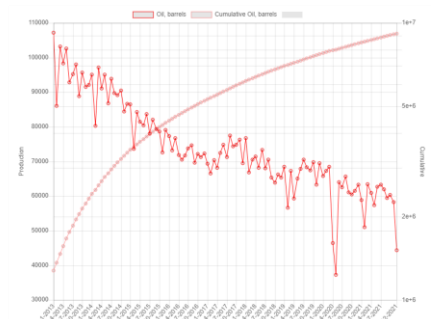
## PRODUCTION RESPONSE

Enercat™ Downhole Tool				
Well No.	Date of Installation	Pre-Enercat Production	Post-Enercat Production	Back calculated Post-Enercat Production
		Oil (bopd)	Oil (bopd)	Oil (bopd)
1	April 4th, 2019	1.3	1.5	1.96
2	July 25th, 2019	5.4	8	10.16
3	August 27th, 2019	2.3	3.8	4.82
4	September 20th, 2019	3	3.6	4.57
5	September 20th, 2019	2.7	18.9	24
6	November 13th, 2019	3	4.8	6.1
7	January 20th, 2020	2.2	2	2.5
8	January 29th, 2020	6.4	8.4	10.4
9	January 24th, 2020	1.5	2.3	2.83
10	March 4th, 2020	7.5	9.5	11.5
11	February 24th, 2020	15	17.8	21.5
12	March 5th, 2020	7.7	10.2	12.3
13	March 10th, 2020	4.8	4.3	5.2
14	February 7th, 2020	1.8	2.7	3.26
15	July 28th, 2020	5.6	6.6	7.8
16	August 4th, 2020	1.9	2	2.35
17	August 17th, 2020	1.2	2	2.35
18	October 19th, 2020	4.5	6.8	7.78
19	November 2nd, 2020	10	10	11.3
20	November 5th, 2020	10	10	11.3
21	April 29th, 2021	3.8	4.5	4.95
22	July 21st, 2021	1.8	2.6	2.8
		103.4		171.73

## PRODUCTION DECLINE AT BEMIS-STUTTS FIELD

Year	Annual Prod (bo)	No. Wells	Cumulative Prod (bo)	Production decline (%)
2013	1,151,784	674	267,563,281	6%
2014	1,079,780	680	268,643,061	11%
2015	959,799	683	269,602,860	9%
2016	875,087	691	270,477,947	1%
2017	865,422	687	271,343,369	5%
2018	826,414	686	272,169,783	4%
2019	793,547	687	272,963,330	9%
2020	724,131	683	273,687,461	3%
2021	702,299	668	274,389,760	
Average decline				6%

Production decline for the Bemis-Stutts field

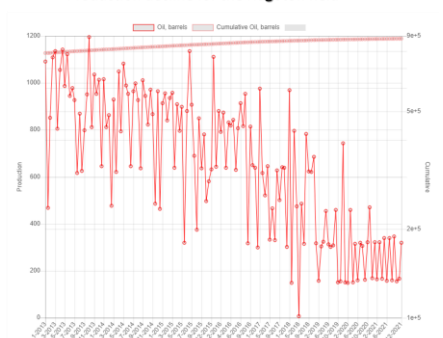


Data from the Kansas Geological Survey

## PRODUCTION DECLINE AT HUGOTON FIELD

Year	Annual Prod (bo)	No. Wells	Cumulative Prod (bo)	Production decline (%)
2013	10,238	10	1,289,433	14%
2014	8,846	10	1,298,279	0%
2015	8,870	9	1,307,149	9%
2016	8,115	10	1,315,264	19%
2017	6,601	10	1,321,865	10%
2018	5,911	9	1,327,776	32%
2019	3,995	9	1,331,771	22%
2020	3,135	2	1,334,906	5%
2021	2,963	2	1,337,869	
Average decline				14%

Production decline for the Hugoton field



Data from the Kansas Geological Survey