

# EVALUATION REPORT

This case history shows comparison between performances of drilling with repaired and new bits. The objectives is to show that repaired bits performance is as good as of new ones.

## SUMMARY

For drilling Apache well in Kalabsha oilfield was decided to use repaired PDC bits.  
Well design:

- 17-1/2"** - Surface Section 40' - 2,640' Vertical – with MT/TCI Bits
- 12-1/4"** - Intermediate Section 2,640' - 9,870' Vertical
  - 2,460'-3900-4900' with TCI Bit (hard formation, interlayers of chert)
  - 3900'-9870- with PDC bit
- 8-1/2"** - Production Section 9,870' - 15,600' Directional - with PDC bits

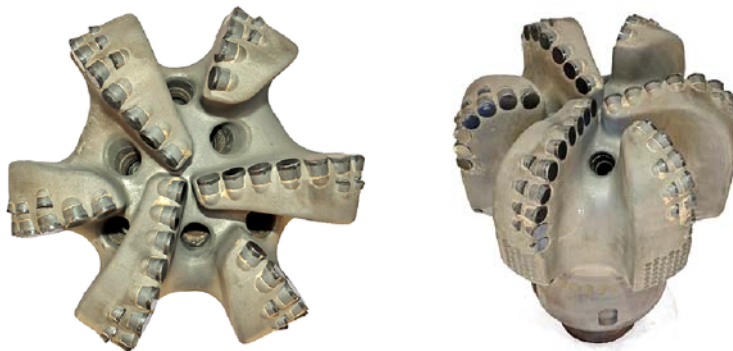
## PERFORMANCE

To continue drilling 12 1/4" hole section the PDC 12 1/4"DP606X repaired bit was selected. The bit drilled through limestone, shale, anhydrite, siltstone, dolomite, and sandstone with an Av. ROP 71,8 ft/hr. In interval 3900-8230, the ROP was in range 70-120ft/hr, but max ROP was limited by parameters. In interval 6700 -8400 lateral vibration were observed due to drilling through Kharitas hard sandstones. In 8200-9150, the ROP decreased to 60-70ft/hr. ROP dropping to 10 fph in limestone, 50 fph in shale. It may be the results of wear due to vibration. Next interval 9160-9200was presented by interlayers of SLTS, LMST and dolomite an. Av ROP was 10 ft/hr. Last interval were drilled with an av. ROP 32 ft/hr. The bit drilled all interval in one run and reached TD. The bit showed good performance.

RUN DETAILS				
In MD/TVD	Out MD/TVD	Distance	Drill Time	Av ROP
ft	ft	ft	hrs	ft/hr
3900	9715	5815	81	71,8

DULL GRADE							
Cutting Structure				Bearing	Gauge	Remarks	
I	O	D	L	B	G	O	R
1	2	BT	S	X	I	WT	TD

The bit came out of hole in good condition. Main cutters on nose area without wear. The normal wear of cutter on shoulder of each blade. The bit is in repairable condition.



DP606X, s/n 7903727

## FOR DRILLING 8 1/2" SECTION WAS DECIDED TO USE REPAIRED PDC BITS AS WELL.

The 8 1/2" hole section were mostly consist of hard abrasive sands, dolomite limestone and shale.

FORMATION	LITHOLOGY
AEB	Slow ROP,hard, Abrasive sands
Masajid	Fractured / Vuggy Dolomite and Limestones
Zahra /Safa/ Desouqy	Hard, Abrasive Sands and Geomechanically Stressed Shales

The bit showed good performance and drilled with same ROP as the new ones. It drilled through hard abrasive formation and came out of hole in good and repairable condition. All the results are comparable with the offsets.

Below presented the bit records and pictures of the bit after drilling.

### BIT RECORDS

Size	Bit	S/N	New RR Repaired	Depth In	Depth Out	Ftg	On Btm Hrs	On Btm ROP	I	O	D	L	B	G	OD	RP
12 1/4"	DP606X	7903727	Repaired	3900	9715	5815	81	71,8	1	2	BT	S	X	I	WT	TD
8 1/2"	T506X	7030336	Repaired	9715	11300	1585	33,5	47,3	1	3	BT	S	X	I	CT	PR
8 1/2"	MSXI616UBPX	JH6995	Repaired	11300	12600	1300	32,5	40,0	1	3	WT	S	X	I	BT	PR
8 1/2"	DP506X	7906355	Repaired	12600	13830	1230	31,00	39,7	1	2	BT	G	X	I	WT	PR
8 1/2"	DP506X	7904736	Repaired	13830	14436	606	35,5	17,1	2	4	BT	S	X	I	LN	PR
8 1/2"	DP506X	7905996	Repaired	14463	14765	302	9	33,6	0	1	NO	A	X	I	NO	DTF
8 1/2"	DP506X	7905996	RR Repaired	14765	15350	585	32	18,3	1	3	WT	A	X	I	CT	TD



T506X, s/n 7030336



MSXI616UBPX, s/n JH6995

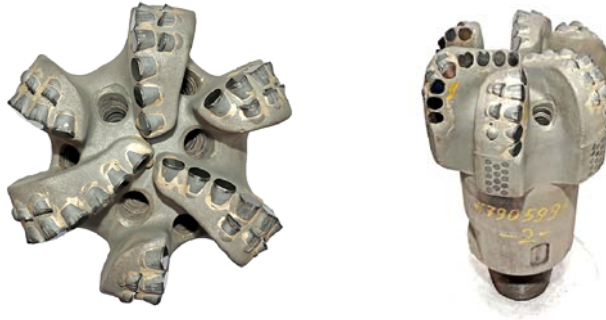


DP506X, s/n 7906355



DP506X, s/n 7904736





T506X, s/n 7905996

## CONCLUSION

The repaired bits met the objectives. The bits can perform same results as the new once. The bits can be repairable more than one, two and several times and show an excellent results.