

PRA[®]

Petroleum Remediation Additive



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environmental solutions

PRA Trial Treatment Report

Trial at Horndean X3 & Herriard X3z

October 2009



REPORT SUBMITTED BY PLUTUS ENVIRONMENTAL SOLUTIONS LTD & STAR ENERGY



Lasham X3Z Herriard Well - published with the kind permission of Star Energy Lincolnshire and Hampshire Oilfield Operations

Objective

To trial PRA[®] product on two different types of beam pump producing wells, one being the **Horndean X3** well and one the **Herriard X3z** well.

Horndean X3 has very little water cut and Herriard X3z has 80% production water cut. Both wells are prone to heavy paraffin wax build up and both have scale issues in and around the pump.



History

Horndean X3 has been producing roughly the same amount for the last five years, with a water production of only 5-6%, this well is hot oil washed every four weeks with 150bbls of dry crude. If the well is stopped for any reason after three weeks the chance of the rods hanging up due to wax is approximately 75%. If the four week wash passes the chance is increased to approx 90%. The fluid level on **X3** has been maintained at approx 30ft above pump which is set at 4300ft.

Herriard X3z has been on production since the 80s and for the last five years has maintained a steady oil/water cut of approx 20bbls oil and 140bbls water. Again the well is hot oil washed with 130bbls of dry crude every four weeks, because of the high water cut the paraffin wax build up is very fast. The fluid level on **X3z** has been maintained at 150ft above the pump which is set at 4000ft.



Treatment

Both wells were treated with 45gals of PRA®, **Horndean X3** on the 20th October and **Herriard X3z** on the 28th October. PRA® was pumped into the Annulus whilst injecting crude from the flow line at the same time; after the 45gals had been pumped away the wells were circulated for two complete tubing strings volume then put back on line to production.

Results

Horndean X3 is in the 8th week of production after the hot oil wash, since adding the PRA® and the Amps (power to run the beam pump) have been maintained at 19/23 since the wash, there has been no build up of wax on the rods. The well has been stopped for routine trip checks and usually after the 4 week hot oil wash if the unit was stopped then the rods would hang up due to heavy wax build up. There is still no sign of the rod string building up weight from wax, also production has increased slightly.

Herriard X3z has had samples taken every day since applying PRA®, the oil water cut has been steadily increasing with the samples cutting out into a three stage cut; oil emulsion and water. After applying heat via a hot water bath, the cut was more prominent (oil/water). The usual oil production from this well is around the 25bbls/day. We have seen the well increase this to 55-60bbls/day. We are also seeing the same Amp readings as **Horndean X3** ie. no build up of wax causing the rod string to gain weight.

The well is still ongoing trials but early indications are looking very good.

Dale Whitehouse

Well Services Supervisor

Star Energy





Results

Below are more detailed stats for the **Herriard X3z** well showing both oil and water cut levels before and after the application of PRA® on the 28th October.

Herriard X3z

Oil/Water Cut - 12th September -27th October 2009 - before PRA®

Date	Time	Gross BBLS	BS & W % H2O	H2O BBLS	NETT BBLS
12.09.09	8.00	101.0	90%	90.9	10.1
13.09.09	8.00	99.1	89%	88.2	10.9
14.09.09	8.00	89.2	92%	82.1	7.1
15.09.09	8.00	84.3	95%	80.1	4.2
16.09.09	8.00	0.0	0%	0.0	0.0
17.09.09	8.00	0.0	0%	0.0	0.0
18.09.09	8.00	0.0	0%	0.0	0.0
19.09.09	8.00	128.4	100%	128.4	0.0
20.09.09	8.00	106.8	100%	106.8	0.0
21.09.09	8.00	91.7	100%	91.7	0.0
22.09.09	8.00	135.3	97%	131.7	3.6
23.09.09	8.00	204.2	85%	173.6	30.6
24.09.09	8.00	211.7	82%	173.6	38.1
25.09.09	8.00	197.0	70%	137.9	59.1
26.09.09	8.00	187.7	84%	157.7	30.0
27.09.09	8.00	144.0	85%	122.4	21.6
28.09.09	8.00	169.8	85%	144.3	25.5
29.09.09	8.00	171.9	85%	146.1	25.8
30.09.09	8.00	175.2	85%	148.9	26.3
01.10.09	8.00	169.2	85%	143.8	25.4
02.10.09	8.00	160.3	85%	136.3	24.0
03.10.09	8.00	168.9	89%	150.3	18.6
04.10.09	8.00	160.6	94%	151.0	9.6
05.10.09	8.00	150.8	85%	128.2	22.6
06.10.09	8.00	159.6	90%	143.6	16.0
07.10.09	8.00	168.3	85%	143.1	25.2
08.10.09	8.00	109.7	100%	109.7	0.0
09.10.09	8.00	176.2	77%	135.7	40.5
10.10.09	8.00	180.4	77%	138.9	41.5
11.10.09	8.00	164.7	82%	135.1	29.6
12.10.09	8.00	140.4	75%	105.3	35.1
13.10.09	8.00	176.9	79%	139.8	37.1
14.10.09	8.00	169	79%	133.5	35.5
15.10.09	8.00	171.4	79%	135.4	36.0
16.10.09	8.00	164.3	79%	129.8	34.5
17.10.09	8.00	32.5	79%	25.7	6.8
18.10.09	8.00	0.0	0.0	0.0	0.0
19.10.09	8.00	132.7	79%	104.8	27.9
20.10.09	8.00	25.5	100%	25.5	0.0
21.10.09	8.00	0.0	0.0	0.0	0.0
22.10.09	8.00	0.0	0.0	0.0	0.0
23.10.09	8.00	0.0	0.0	0.0	0.0
24.10.09	8.00	0.0	0.0	0.0	0.0
25.10.09	8.00	0.0	0.0	0.0	0.0
26.10.09	8.00	0.0	0.0	0.0	0.0
27.10.09	8.00	202.3	79%	159.8	42.5
Averages before PRA®		111.4	71%	97.5	16.3

Hot wash during this time

Rod break during this time



Herriard X3z

Oil/Water Cut - 28th October -30th November 2009 - after PRA®

Date	Time	Gross BBLS	BS & W % H2O	H2O BBLS	NETT BBLS
PRA® added					
28.10.09	8.00	224.7	85%	191	33.7
29.10.09	8.00	143.6	85%	122.1	21.5
30.10.09	8.00	168	85%	142.8	25.2
31.10.09	8.00	164.5	95%	156.3	8.2
01.11.09	8.00	158	87%	137.5	20.5
02.11.09	8.00	165.2	87%	143.7	21.5
03.11.09	8.00	154.6	87%	134.5	20.1
04.11.09	8.00	156.1	87%	135.8	20.3
05.11.09	8.00	155.2	73%	113.3	41.9
06.11.09	8.00	152.7	81%	123.7	29.0
07.11.09	8.00	150.6	80%	120.5	30.1
08.11.09	8.00	81.3	64%	52.0	29.3
09.11.09	8.00	166.2	82%	136.3	29.9
10.11.09	8.00	153.5	87%	133.5	20.0
11.11.09	8.00	154.1	85%	131.0	23.1
12.11.09	8.00	154.3	80%	123.4	30.9
13.11.09	8.00	148.8	80%	119.0	29.8
14.11.09	8.00	148.7	80%	119.0	29.7
15.11.09	8.00	24.8	80%	19.8	5.0
16.11.09	8.00	149.4	75%	112.1	37.4
17.11.09	8.00	155.6	85%	132.3	23.3
18.11.09	8.00	148.7	73%	108.6	40.1
19.11.09	8.00	147.2	65%	95.7	51.5
20.11.09	8.00	147.2	58%	85.4	61.8
21.11.09	8.00	145.9	59%	86.1	59.8
22.11.09	8.00	142.9	57%	81.5	61.4
23.11.09	8.00	39.2	49%	19.2	20.0
24.11.09	8.00	121.4	85%	103.2	18.2
25.11.09	8.00	135.2	90%	121.7	13.5
26.11.09	8.00	145.7	87%	126.8	18.9
27.11.09	8.00	141.7	80%	113.4	28.3
28.11.09	8.00	136.8	80%	109.4	27.4
29.11.09	8.00	138	80%	110.4	27.6
Averages after PRA®		143	76%	114	29.1

Result

In the one month period PRA® was added to the well, average (BOPD) increased by 12.8 barrels per day, an overall increase of 78%.



plutus[®]
environmental solutions

Plutus Environmental Solutions Ltd

10 Exchange Road
Lincoln
LN6 3JZ

Tel: 01522 694445
Fax: 01522 694445
Email: sales@plutuses.com
Web: www.plutuses.com