



Case Study - PARALAX Treatment in Kazakhstan

Introduction

ZM field is located in the prolific Western Kazakhstan a region rich on hydrocarbon resources. As with most of the fields in this region oil is produced from sandstone formation where all components of crude oil are kept in equilibrium. Primary drive mechanism of production on ZM field is a screw pump that lifts oil up the tubing to the surface. Oil recovery results in shifting equilibrium to the point where dissolved wax solidifies and drops out of oil.

Wax deposits on tubing walls, thus creating following problems:

- Resistance to oil flow. Result: well underperforms, production rate less than potential
- Resistance to rod/shaft movement. Result: high torque on pump shaft and high amperage current on pump motor
- Pump failure due to shaft/rod breaking. Result: expensive work over to fix it
- Reduction of pump efficiency due to wax inside pump compression chambers. It happens when gas and wax go together. Wax deposit inside cause bad sealing and gas compresses and bounces back thru imperfect seal. Result: less production at given pump RPM.

Ultimately the problem of dealing with wax is costing operators millions of dollars worth of losses of oil unproduced and remedial efforts. And it is not just a ZM problem less than half of all oil producers are endowed with wax-free oil, others are not so lucky. But now there is a solution – PARALAX.

The client, owner of ZM field provided a well for a PARALAX trial. The well is a good candidate for wax treatment, similar to many other wells it requires frequent, once every 2-3 weeks, a program of hot oil treatments to prevent plugging inside of the production tubing, but it still does not address issue of well underperformance.

Pre-Treatment data:

Pump RPM: 300

Produced fluid: oil with gas

Load amperage: 21A

Torque load: 52%

Dynamic FL: 250m

Oil flow rate: 170bopd





Problem description

As the picture above shows the well is showing significant signs of wax build up in the tubing so it was chosen as the candidate for a PARALAX trial. The client chose this well hoping to for due to its problematic nature of wax blockage and declining performance between pervious wax cuttings.

Treatment setup

The client used a chemical injection pump with pump rate 16ltr/hr. PARALAX used: 104ltr. Job done as per the procedure agreed with Client, even though the well was different from the one initially discussed.

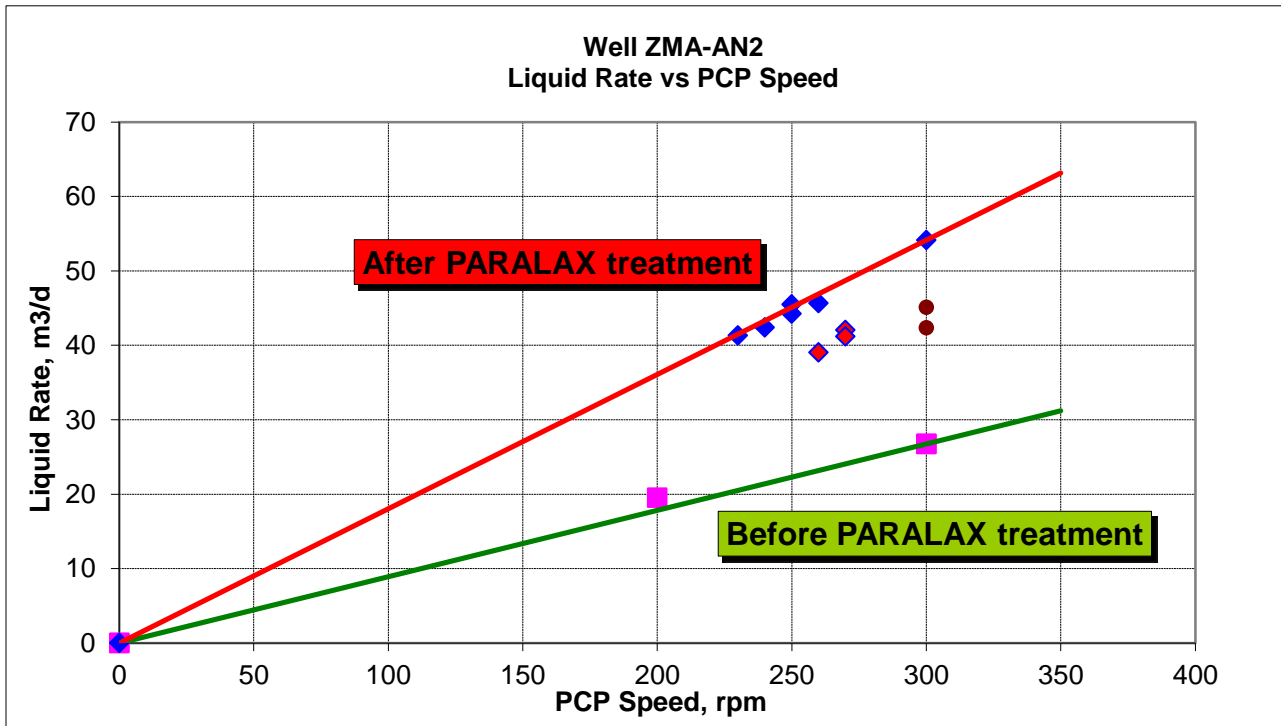


There were a few shutdowns due to exceeding the pressure limits and wax plugging between the rod and tubing, causing sticking. A couple of reverse rotations and bleeding the annulus pressure allowed the pump to resume circulating and pumping. On the third hour of treatment the pump torque dropped to 35% and amperage to 18A. By the end of treatment the torque stabilized at 33% and amperage at 17A.

Post-Job data

There are obvious signs of improvement. The Well produces less gas and more oil, annulus level dropped and flow rate increased at same RPM. Below is immediate post-job results:

Pump RPM: 300
Produced fluid: oil with less gas
Load amperage: 16A
Torque load: 44%
Dynamic FL: 115
Oil flow rate: 378bopd



Graph (Above) outlining significant improvements in progressive cavity pump (PCP) performance

Treatment evaluation

Result of the treatment exceeded any optimistic expectations. Production still remains at post job level and no early indications of wax showing up after 12 weeks of operation.

The well was producing 170 bopd at 300RPM. After the PARALAX was introduced the oil flow rate went up to 378 bopd at same 300RPM. It was decided by the client that this could be too much flow rate causing too much drawdown and possibly creating sand and water production from lower formations. The client decided to reduce RPMs to 250 where a production rate of 265bopd has stabilized in long term.

Parameters	Before PARALAX	After PARALAX
Oil flow rate, bopd	170	265
Pump RPM	300	250
Relative torque on pump shaft, %	52	40
Electric current load, Amps	21	19

During the 90 days following treatment this well produced an additional 95 bopd per day for a total of 8550 bbls.

This well is now treated every 90 days to maintain production.

We recommend well treatments every 90 days to maximize production and minimize maintenance time, treatments and costs.

What can we do for your wells?