CASE STUDY

ClearWELL
Continuous Scale Control

CLEARWELL MORE THAN DOUBLES RUN-TIME FOR TWO PCP WELLS IN OMAN AND OUTPERFORMS KPIS.

LOCATION: Oman **APPLICATION:** Progressing Cavity Pump Oil Wells




BEFORE CLEARWELL™

Two progressing cavity pump (PCP) rod-driven wells in Oman were suffering from calcite scale deposition, which was severely affecting the pumping equipment. Scale had been observed on both the rod strings and production tubing and the wells were experiencing multiple equipment failures with a run life of just 6-8 months before intervention was necessary.

The operator had been treating the scale with an acid dissolver and although successful, these remedial treatments can corrode the production tubing and equipment, leading to more terminal failure and the requirement for well workovers. Each remedial intervention was costing the operator in the region of $100,000 including production deferment.

As an alternative solution, ClearWELL's non-invasive, electromagnetic technology was trialled by the operator to compare its effectiveness. Key performance indicators (KPIs) were established at the start of the trial to measure comparative equipment run-time, production rates and flow assurance.

The operator's objective in using ClearWELL™ was to double the run time of both wells and reduce the frequency of corrosive acid treatments. In turn this would reduce the HSE risk of chemical handling, protect the integrity of the downhole tubing and equipment and improve overall well performance.

WELL ASSESSMENT

Scale is problematic for all types of wells but greatly impacts mature artificial lift wells with increased water cut. Their marginal economics and the cost of intervention and replacement of equipment, means that remediation options can be challenging. These wells provide the ideal scaling environment, but the flow dynamics of chemical treatments can struggle to access and treat the small apertures of lifting equipment. Acid treatments can also be detrimental to equipment integrity so operators have been seeking a more effective solution for some time.

Analysis of the well architecture and downhole conditions, electromagnetic field (EMF) simulation modelling, scaling predictions and onsite testing were carried out by ClearWELL to provide pre-installation performance assurance to the operator. In-house analysis and on-site testing confirmed both wells were excellent candidates for the technology.

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AFTER CLEARWELL™

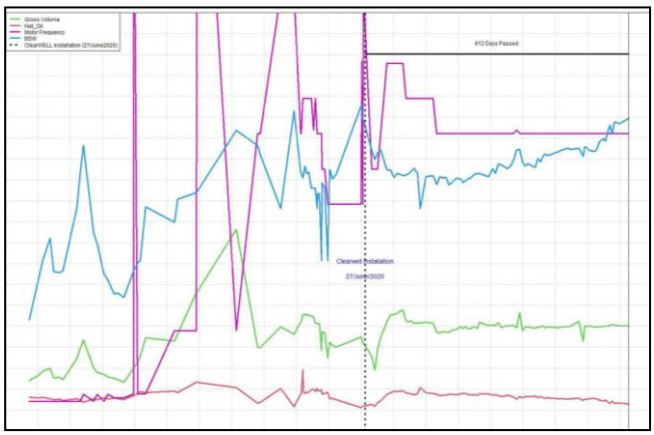
After installing the ClearWELL™ units, the gross produced volume, net oil, motor frequency and basic sediment and water rates were shown to stabilise and then remain reasonably constant during the period of the trial. Prior to ClearWELL™ the rates varied dramatically, which can be seen in the charts below.

In well one, run-time was increased from 8 months to 20 months at which point the trial was ended. In well two, run-time increased from 6 months to 15 months with the end of the trial coinciding with a non-scale related integrity issue requiring intervention. During the intervention, the pump and rods were inspected and reported as scale free and in good condition.

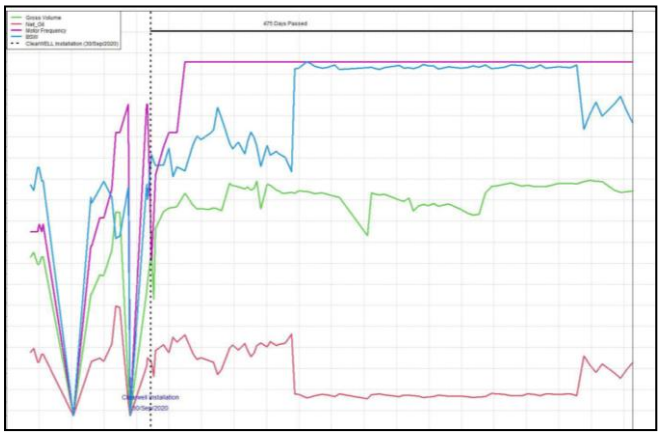
With improved run-time and KPI performance, plus visible absence of scale, both well trials were considered a success and the ClearWELL™ technology is to remain on these wells long-term.

Well Performance Before and After Installing ClearWELL™.

Well One



Well Two



Key

- Gross volume
- Net oil
- Motor frequency
- Basic sediment in water
- ClearWELL installation

THE PROCESS

- The ClearWELL™ unit is connected to production equipment at the surface wellhead – no intervention required, no loss of production.
- The unit transmits a pulsed radio frequency signal down into the wellbore or along flowlines and equipment. The pulsed signal delivers energy to the scaling ions, controlling precipitation, keeping the liquid below saturation and minimising scale growth on production equipment.
- ClearWELL use satellite monitoring to ensure optimum unit performance. Where required personnel perform regular non-intrusive equipment checks.
- ClearWELL systems are low power consumption and supplied as a certified Class 1, Zone 1. The AC signal system is corrosion neutral, no reported gauge signal interference.

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