

Powerwave Waterflood

Location	West Texas, Permian Basin
Operator	Large Independent U.S. Oil and Gas E&P Company
Formation	Dolomite
Reservoir Fluid	25° API Oil
Objectives	Improve sweep efficiency, increase production and reserves
Date installed	November 2009

EXECUTIVE SUMMARY

Powerwave has been employed in five injection wells for approximately 10 months to improve oil recovery from this field. Significant production benefits have been realized during this period:

- Pay-back for the project at an assumed oil price of \$75 per barrel and company netback of \$45 per barrel was within three months.
- With the same assumptions, incremental revenue attributed to the Powerwave installations was over \$120,000 in month 10 (incremental profit for the same month has been estimated at ~\$72,000).
- Rate of Return on project is over 100%.
- Oil production from five production patterns (25 production wells) has increased by 55 barrels of oil per day over the established base production decline trend (an overall production increase of almost 50%).
- Powerwave has significantly affected the production decline. The base oil decline was 2.7% per month. Production is still increasing and as such no post Powerwave decline number is available at this time.
- For month 10, an additional 1,600 bbls of oil per month has been attributed to Powerwave. Cumulative benefit stands at over 6,500 bo.
- The average oil cut after 10 months of Powerwave has increased to 9.8% compared to 8.0% based on the previously established trend (overall average oil cut increase of around 23%).
- All five production patterns experienced a production increase. Production increases on the pattern level ranged from 12% to 57%.

INTRODUCTION

The first commercial discovery oil well in the Permian Basin was named for W.H. Abrams, leasing agent for the Texas and Pacific land trust. The well first produced oil in February 1920 at a depth of 450 feet.

The Permian Basin is still one of the largest petroleum-producing basins in the U.S. In 2002, it accounted for 17% of the total U.S. oil production, and it contains an estimated 22% of the U.S. proved oil reserves. The around 29 Bbbl of oil produced to date represents only 27% of OOIP. This region has the biggest potential for additional oil production in the country, containing 29% of estimated future oil reserve growth.

The yellow and orange shaded areas on the map in Figure 1 below shows the extent of the Permian basin.

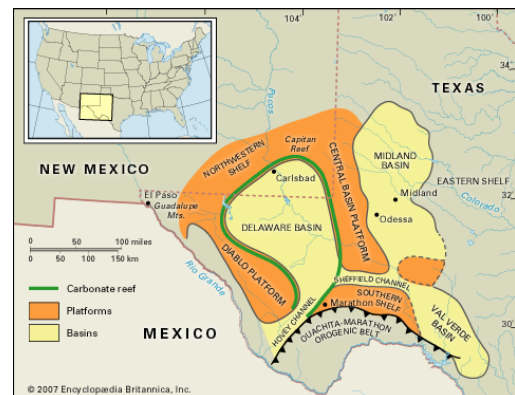


Figure 1 – The Permian Basin

DISCUSSION

No significant changes to injection, no wellwork or other work that could impact the outcome of the Powerwave trial took place during the project.

The production data from this Operator is of high quality, but some of the wells had to be corrected for a change in the watercut measurement that took place in the beginning of February 2010. A change was made from using Micro Motion meters measurement to direct watercut measurements. The sum of the well tests prior to this change was 20% outside actual sales and within 5% after the change.

Wavefront Powerwave™ Case History

Permian Basin Waterflood, Permanent Installation



The correction was made by a making a ratio shift of the affected data, realigning the oil cut trend and recalculating the oil rate. To verify the validity of this correction method, the Powerwave benefits were confirmed by an analysis of four control groups where no production improvement was seen.

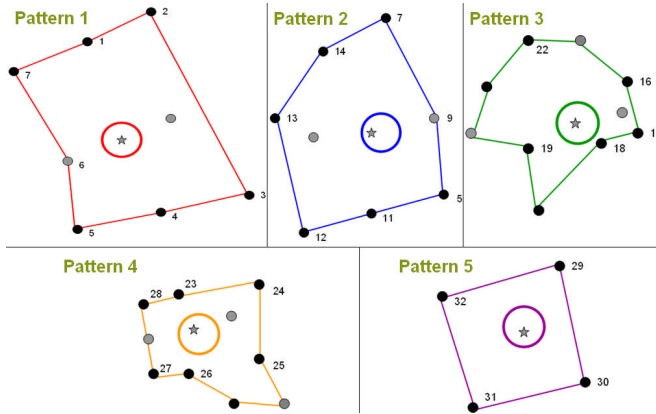


Figure 1 – Powerwave Project Area

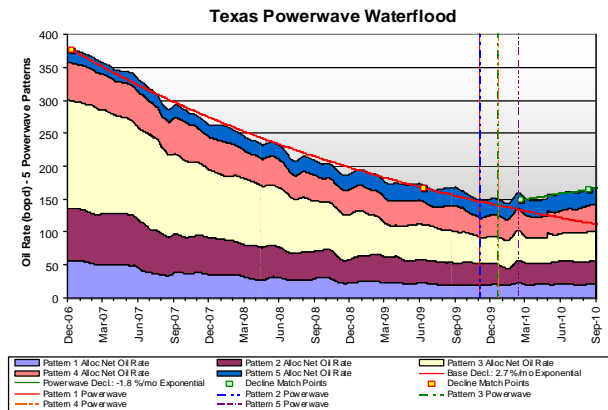


Figure 2 – Overall Project Production Response

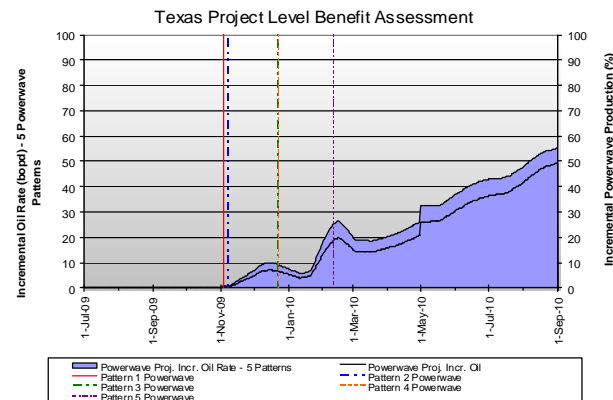


Figure 3 – Overall Project Production Benefit

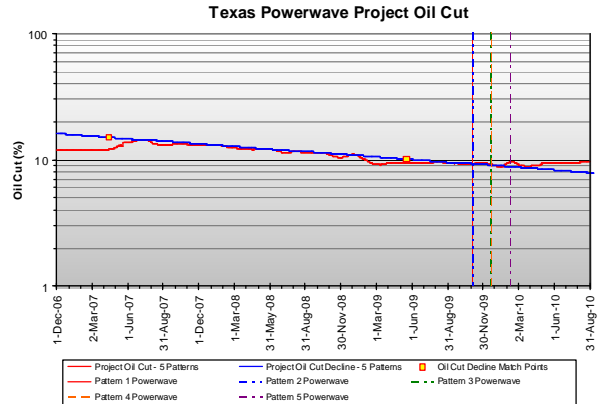


Figure 4 – Project Oil Cut

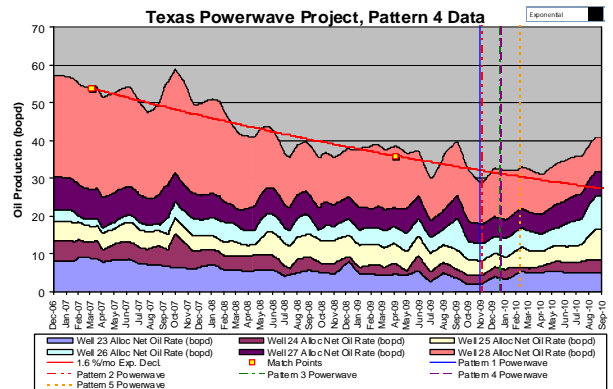


Figure 5 – Pattern 4 Production Response

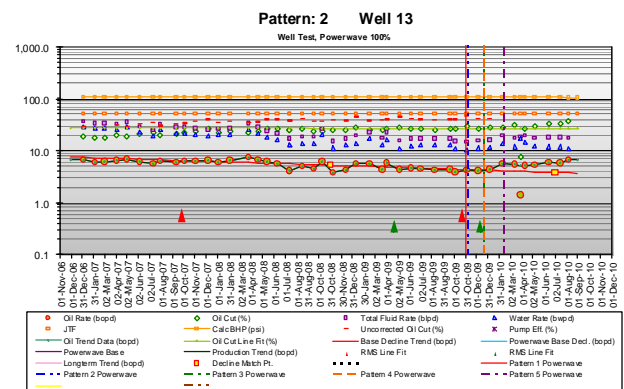


Figure 6 – Example of a Representative Well

For further information, please contact a Wavefront sales representative by e-mail: info@onthewavefront.com or visit our website: www.onthewavefront.com