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Re-plumbing the 100-Year-Old Pennsylvanian Bartlesville Sandstone Reservoirs in Northeastern Oklahoma*

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Abstract

This article discusses the results of combining the understanding of the depositional environment of an incised valley with drilling low-cost horizontal wells to re-activate an abandoned waterflood in Osage County, Oklahoma. The targeted reservoir is the Pennsylvanian Bartlesville Sandstone. By employing a rigorous team effort that included geological depositional interpretations and tracer surveys, a clearer picture of the effects of utilizing the existing aquifer for pressure support has emerged.

The re-activated waterflood arose from a 2003 Department of Energy-funded project to conduct a field pilot test in the abandoned North Avant Unit, utilizing horizontal producing and injection well. The original pattern of two horizontal producers and a central horizontal injection well proved to be ineffective in mobilizing oil and was un-economical.

In an attempt to improve project economics, the two horizontal producers were plugged back and re-drilled 180 degree from the original well paths and higher in the reservoir. An existing vertical well located between the predrilled horizontals was permitted and now serves as the injection well. The use of the horizontal injection well has been significantly curtailed

Bottom Line

Since this “geology”-based waterflood was implemented in 2005, approximately 180,000 barrels of oil and 3.0 million barrels of water have been produced from an area of about 640 acres. The current production rate is 145 BOPD and 3200 BWPD, which is an average oil cut of 4.5%, from this re-activated waterflood.

References

Andrews, R.D., 1997, Fluvial-dominated deltaic (FDD) oil reservoirs in Oklahoma - The Bartlesville play: Oklahoma Geological Survey Special Publication 97-6, Part 1, 93 p.

Dietz, Carl F., 1995, Regional stratigraphy and oil and gas potential of the McClouth Formation in the southern Forest City Basin of northeast Kansas: M. Sc. Thesis, Colorado School of Mines, Denver, Colorado, 2 volumes, 173 p.

Guo, G., and H.B. Carroll, 1999, A new methodology for oil and gas exploration using remote sensing data and surface fracture analysis: U.S. Department of Energy, BDM, Bartlesville, Oklahoma, DOE/PC/91008-0163 OSTI_ID:3244, 94 p., Web accessed 27 April 2011, http://ebookbrowse.com/doe-pc-91008-0163-pdf-d84291467

Kelkar, M., C. Liner, and D. Kerr, 1996, Integrated approach towards the application of horizontal wells to improve water flooding performance: 1995 Annual Report: U.S. Department of Energy, National Petroleum Technology Office, U.S. Department of Energy, DOE/BC/14851-16, 55 p., Web accessed 27 April 2011, http://www.netl.doe.gov/KMD/cds/disk17/C%20-%20Drilling%20Completion%20Stimulation/14951/DOE-BC-14951-16-DE96001236-.pdf

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