Selection and Treatment of Stripper Gas Wells for Production Enhancement in the Mid-Continent

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Abstract

Stripper gas wells are an important source of domestic energy supply and under constant threat of permanent loss (shut-in) due to marginal economics. In 1998, 192 thousand stripper gas wells produced over a Tcf of gas, at an average rate of less than 16 Mcfd. This represents about 57% of all producing gas wells in the onshore lower-48 states, yet only 8% of production. Reserves of stripper gas wells are estimated to be only 1.6 Tcf, or slightly over 1% of the onshore lower-48 total (end of year 1996 data). Obviously, stripper gas wells are at the very margin of economic sustenance. As the demand for natural gas in the U.S. grows to the forecasted estimate of over 30 Tcf annually by the year 2010, supply from current conventional sources is expected to decline. Therefore, an important need exists to fully exploit known domestic resources of natural gas, including those represented by stripper gas wells.

The overall objectives of this project are to develop an efficient and low-cost methodology to broadly categorize the well performance characteristics for a stripper gas field, identify the high-potential candidate wells for remediation, and diagnose the specific causes for well underperformance. With this capability, stripper gas well operators can more efficiently and economically produce these resources and maximize these gas reserves. A further objective is to identify/develop, evaluate and test “new and novel,” economically viable remediation options. Finally, it is the objective of this project that all the methods and technologies developed in this project, while being tested in the Mid-Continent, be widely applicable to stripper gas wells of all types across the country.

The project activities during the reporting period were:

- Completed both type curve and artificial neural network analysis of the field. Developed list of production enhancement candidates.
- Made final presentation of results to Oneok in Tulsa (February 26).
- Made presentations on the project at the PTTC Marginal Well workshops in Tyler (February 6) and Lansing (February 19).

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Experimental

For the subject period, the following activities were performed:

- Completed both type curve and artificial neural network analysis of the field. Developed list of production enhancement candidates.
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Results and Discussion

Based on both the type-curve and artificial neural network analysis, five “high-priority” and 17 “next-priority” remediation candidates were identified. The diagnosed causes for well under performance included poor initial stimulation, insufficient wellbore dewatering, or high backpressure. Restimulation techniques being considered for the candidates include high-energy gas fracturing, hydraulic fracturing, and acidizing. Installation at artificial lift and/or compression is also being considered. Oneok will now proceed with implementing the recommendations and observing the results.

Conclusions

A combination of type-curves and artificial neural networks has successfully identified potential remediation candidates. The accuracy of these selections will be tested when the field results are obtained.

References

None.