

ABSTRACT

Feasibility of Implementing an Automated Control System for Gas Lift

Optimization

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Oil production began from the Samaan Field (Trinidad) in 1972, however by December 1984 approximately 85% of the producing oil wells were on gas lift. Today (1999), high pressure gas for the purpose of gas lift is supplied by two compressor trains. This high pressure gas is not only a vital commodity to the Samaan Field for gas lifting its wells, but also provides a substantial profit by means of gas sales to the other fields. Hence, the objective of any gas lift optimization strategy should be two-fold: (1) to maximize oil production and (2) provide efficient allocation of lift gas to the producing wells thereby allowing more high pressure gas to become available for sale. This project report was able to show that an automated system is capable of satisfying both of the above criteria.

The first step in determining the feasibility of implementing an automated system is developing Gas Lift Performance Curves for all the wells. This was performed via two methods: physically testing the well and a system analysis approach whereby the well's current performance is modeled. Then by comparing the Current Policy with two other well-established policies (Maximum Rate and

Economic Rate) one was able to determine whether the Current Injection Policy, as practiced by the Samaan Field, is indeed the most advantageous. It was discovered that the Current Policy could indeed yield the most profits overall if it was supported by the platform infrastructure. Lack of system control in maintaining the recommended injection flowrates as deemed by the Current Policy resulted in three percent (3%) loss in oil production and fourteen percent (14%) increase in gas consumption. In addition two gas allocation programs were examined in relation to the Samaan Field for the case of low gas availability. The two established practices being Priority Method and Equal Slope Allocation Method.

Using the above figures of three percent (3%) incremental oil production and fourteen (14%) incremental gas sales revealed that the system could be paid for in approximately 4.1 months, hence profits could be realized within the first year. Other than the tangible economic benefits that could be achieved through automation there are also a number of intangible benefits that are attained simultaneously. Some of these being more efficient utilization of manpower, capability to trend data, increased frequency of well testing and increased safety etc. This project report has shown that the incentive for automated gas lift control in the Samaan field is highly attractive.

Keywords: Simone Marissa Mooking; Automated System; Gas Lift Optimization; Performance Curves; Policies.