Continuous Gas-Lift Optimization: Offshore Gulf of Mexico

Background
The Ship Shoal 208 field is located fifty miles off the coast of Louisiana in the Gulf of Mexico. Currently, there are forty-five out of fifty wells on continuous gas-lift. Ideally, continuous gas-lift wells would receive optimum injection gas supply. However, this field can only supply 30,000 MCF per day, which is only 60% of the optimum supply. Injection rates to gas-lift wells fluctuate due to compressor shut-downs, variation in supply pressure, and other production upsets. Therefore, field operators must go to each well and manually adjust the gas-lift rate on a trial-and-error basis (6). This approach to stabilizing injection gas is inefficient because it requires increased manpower and results in production loss. The goal of the gas-lift optimization system is to inject less gas to the less productive wells but continue to inject the optimum rate to the most productive wells (1).

Technical Description
The gas-lift optimization system employs four tools to achieve its goal. The first tool, constant gas-lift injection rate, constantly measures gas-lift rates and adjusts the injection choke accordingly. The second tool, real time wellhead surveillance, transmits temperature and pressure data to the central computer. The third tool, optimization well tests, determines optimum gas-lift injection rates on each well. The last tool, data to desktop, relays all the system data to the office headquarters and stores it in a database (3).

Field Criteria
The main criterion is that the field must meet industry standards in gas-lift equipment (2). A properly-equipped gas-lift field that lacks equipment to measure and monitor production data is the best candidate for optimization. The last criterion is the necessity to decrease field operating costs.

Method
Each wellhead, gas-lift header, and test separator must be upgraded with pressure, temperature, and flow transmitters and switches to communicate with the computer system (3). The central component of the optimization system is a Programmable Logic Controller (PLC) installed in a control room with Control-Net communication to the field panels. The PLC transmits data to the Human Machine Interface (HMI) software package, which displays the information for platform operators (3). Everything in the field can be controlled from the HMI software.

Costs
The total cost for the entire optimization system, including installation and training, is $860,000 (3). All offshore operators would be instructed in use and troubleshooting of the system. With an estimated production increase of 350 BOEPD, the project would be paid out in about two months.
Qualifications

After working on a manual gas-lift optimization project at Ship Shoal 208, I feel confident proposing a modern gas-lift optimization system. Additionally, my current petroleum courses provide me with extensive knowledge that can be applied to the specifics of gas-lift optimization.

Conclusion

The next step is to order the necessary parts to upgrade the production equipment, and purchase the computer hardware, software, and communication equipment to complete the optimization system. There are similar fields in the Gulf of Mexico to base justification of the project from. BP’s Amberjack field, located forty miles northeast of Ship Shoal 208, recently installed one such system and increased production 600 BOEPD (3).

Sources


