



## **Continued System Efficiency Improvements for Airlift Pumping System**

### **Executive Summary**

Airlift Services International (ASI), a Division of Energy, Inc., is an Indiana-based oil service company. ASI, now in the initial marketing phase, is the first company to successfully and economically pump oil and other fluids using compressed air and natural gas. To date, ASI has successfully pumped more than 175,000 barrels of fluid from wells in four states including deliquification of three gas wells. The Airlift Oil Pumping System (Airlift) is designed to increase profits for owners of marginal or stripper wells by increasing well production through the reduction of maintenance costs and increase of uptime and efficiency.

Airlift Services International was the recipient of a grant awarded by the Stripper Well Consortium in 2006. This grant was for “Increased Pumping Capacity and Depth for Airlift Pumping System” (42098R). The work was done in conjunction with Taylor University in Upland, Indiana. This grant provided for computer simulation of the current design, a prototype build of an optimized design as quantified by the computer model, and validation of the simulation model in a working oil well. Then the model was used to define an optimized design in an effort to define an airlift pump capable of pumping 100 barrels per day at 3000 feet.

Modeling to date has shown significant performance benefits of making the following changes:

1. Increase in the size of the airlines. The model has also shown that airlines should be varying lengths to better optimize flow as fluid is moved up the system.
2. Use helium or other inert gases as the driving gas in the system to improve system efficiency.
3. Develop a closed loop system to improve efficiency.
4. Lower operating pressures improve system efficiency.

Significant material changes will be required to implement the indicated changes. The model has been used to predict the fluid flow from a 3000-foot well. An ASI 1400-foot test well is being used to continually validate the accuracy of the system model. Incrementally implementing the improvements indicated by the model will provide a more cost competitive and superior performing pump for marginal wells.