QUARTERLY PROGRESS REPORT

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Abstract

The original proposal described the construction and operation of a 1 MMscfd treatment system to be operated at a Butcher Energy gas field in Ohio. The gas produced at this field contained 17% nitrogen. During pre-commissioning of the project, a series of well tests showed that the amount of gas in the field was significantly smaller than expected and that the nitrogen content of the wells was very high (25 to 30%). After evaluating the revised cost of the project, Butcher Energy decided that the plant would not be economical and withdrew from the project.

Since that time, Membrane Technology and Research, Inc. (MTR) has signed a marketing and sales partnership with ABB Lummus Global, a large multinational corporation. MTR will be working with the company's Randall Gas Technology group, a supplier of equipment and processing technology to the natural gas industry. Randall's engineering group found a new site for the project at a North Texas Exploration (NTE) gas processing plant, and we are now negotiating with Atmos Energy for a final test of the project demonstration unit. Several commercial sales have also resulted from the partnership with ABB, and sales of nitrogen/natural gas membrane separation units now total \$2.3 million.

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Introduction

The U.S. natural gas pipeline specification for inert gases is less than 4%. On this basis, about 17% of known U.S. reserves of gas are sub-quality due to high nitrogen content. Some of this gas can be brought to pipeline specifications by dilution with low-nitrogen-content gas; some is treated by cryogenic condensation and fractionation. Nonetheless, about 1.0 trillion scf of known reserves are currently shut in.

This project covers the first demonstration of a new membrane technology to treat this otherwise unusable gas. The objective of this project is to develop a membrane separation process to separate nitrogen from high-nitrogen-content natural gas. To demonstrate the process, a proof-of-concept plant is being built for a North Texas Exploration (NTE) gas field in Texas/Oklahoma.

Additional test sites are also being explored.

Experimental Update, Results and Discussion

We are actively pursuing alternative sites for the original demonstration system which is currently stored in Houston. We are hopeful that the ongoing negotiation with Atmos Energy will lead to placement of that unit at another facility in North Texas. If this happens, it will probably be installed in Q2 2006.

Results obtained from the limited time the system was operated at the NTE site were encouraging. We now have several commercial systems installed or in the process of being installed. Operational data from these units meet or exceed the design performance guarantees.

Commercialization Update

Additional Field Sites. The Twin Bottoms system continues to be operated continuously and is now operating at its maximum design capability. Another unit similar to the Twin Bottoms unit has been delivered to Interstate Energy in Kentucky, and a system fabricated for the First National Bank of Omaha is being installed in Omaha, Nebraska.

Other Commercialization News. Two new orders were received in 4Q 2005. Commercial sales of natural gas/nitrogen membrane separation units related to this project technology now total \$2.3 million.

Conclusions

MTR has successfully tested the nitrogen/natural gas separation process in a commercial unit and demonstrated its performance at one wellhead site in Kentucky. The successful demonstration has resulted in the sales of several additional commercial units. All installed commercial units are operating at or better than guarantee conditions and our clients have given us several good references for further development of this business. Commercial sales total \$2.3 million for the product line developed from this project. Further sales are expected in 2006.

References

None cited.