Construction of the First New Glycerol Dehydration System in the Last 15 Years at Denbury's Gluckstadt Facility

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ABSTRACT

Denbury Onshore LLC (Denbury) is currently building the world's third glycerol dehydration unit for drying carbon dioxide (CO_2). There are two other known glycerol dehydration systems in the world; of which, one is still operating on a CO_2 production gas stream. The Denbury unit will be the first new glycerol dehydration system built in over 15 years. Fabrication of major vessels is underway as of July 2004, and startup is scheduled for early 2005.

Glycerol dehydration is a process that is used when high-pressures and non-idealities cause excessive vapor losses of glycol (example glycols: ethylene glycol, diethylene glycol, trietheylene glycol), which makes normal glycol dehydration uneconomical. The use of glycerol (also known as glycerin) may be desirable in high-CO_2 dehydration applications, high pressure gas applications, and in acid gas compression and dehydration applications associated with natural gas production facilities. Such applications are growing in number within the CO_2-flood EOR community and the natural gas industry, especially in combination with deeper reservoirs and/or overseas.

This paper discusses differences between glycerol and glycol dehydration with supercritical, dense-phase CO_2 gas streams. This paper also discusses the design, and construction of Denbury's new glycerol dehydration system. Since commercial process simulators are not well suited for design of this type of system, Trimeric Corporation developed a means to rigorously predict phase equilibria in the absorber as part of the project. The simulator and other available data were used to design the Gluckstadt glycerol dehydration unit.