OTC-23079-MS

Mobile Gas Lift Compressor and Well Unloading System for Enhancing Oil Production and Reserves, While Reducing Greenhouse Gas Emissions in Offshore Environments

Abstract

The mobile offshore gas lift system discussed in this paper is a novel conceptcombining two production enhancement methods for oil wells which enables theunlocking of vast oil resources from offshore reservoirs. The system has beensuccessfully trialed in Benchamas Field, Gulf of Thailand (GoT), addingsignificant incremental production and reserves, while reducing greenhouse gasemissions from legacy 'Well Unloading Units' used in the field.

The innovative system, named WUUC, optimizes oil production by allowing wellsto be subject to very low backpressure at surface while also being gas liftedsimultaneously, using otherwise vented hydrocarbon gas.

The system incorporates a 3 phase separator and surge tank to separate fluidsfrom the production stream, with an inlet pressure as low as 30 psi. Liquidsare pumped back into the production pipeline at system pressure while the gasis captured in a 3 stage reciprocating compressor, compressed to approximately1100psi, and directed to a gas lift manifold which distributes the gas tomultiple wells for gas lifting.

A unique aspect of this system is its mobility. The entire system is modularand can be rigged up or down in a single 12 hour shift offshore, using standardplatform cranes. This enables the unit to service multiple wellhead platformsoffshore for maximum usage, supporting a low cost, pay-as-you-go rental modelfor the equipment. Its small footprint offshore allows flexibility to performwireline activities simultaneously while operating the unit, an importantbenefit in high activity operations such as Thailand.

The system began field testing in July 2009 on the 'REX' platform in BenchamasField, GoT. 2 MMscf/d of associated gas is captured from the production stream,compressed to high pressure and used to gas lift four oil wells (previouslyshut-in and depleted) on the remote platform, adding 2,000 bopd incrementaloil. The production results and system reliability have been outstanding. After2 ½ years of operation the unit has had 97% reliability and added over 900 Mstbof incremental oil. These are reserves which would otherwise have been leftunrecovered due to economic constraints of installing a conventional gas liftcompressor and/or electrical submersible pump (ESP) on the remote wellheadplatform.

In addition to these production gains, the system has prevented the release ofover 1.5 Bscf of greenhouse gas, which would otherwise have been vented toatmosphere, and utilized it instead for gas lifting application.

Due to its mobility, low risk pay-as-you go business model, and smallfootprint, the WUUC system has potential to be applied in multiple offshorelocations globally, adding significant oil production and reserves, whilereducing greenhouse gas emissions.