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Use of Sonar Metering to Optimize Production in Liquid Loading Prone Gas Wells

Abstract

The East Brae platform is located in UK Block 16/3a and is operated by Marathon Oil U.K. LLC. The platform has a high pressure (HP) separator 406 psig (28 barg) and a test separator operating as a low pressure (LP) production separator 217 psig (15 barg). There are currently 12 producing gas wells; varying water-gas ratios and low gas rates result in liquid loading being a major flow assurance issue. This paper discusses the use of clamp-on sonar flow meters to minimize losses associated with well testing and the subsequent benefits that were seen with respect to production optimization and well deliquification. Clamp-on sonar flow metering is a non-intrusive technology which measures the flow velocity of the fluid stream. Sonar meters have been deployed every two months to facilitate routine production well testing of all wells to meet allocation and field management requirements. Prior to sonar metering, wells capable of only flowing to the LP separator needed to be shut-in to allow individual well tests. Wells can now be individually sonar well tested without production interruption. Different methods have been adopted to optimize production and combat liquid loading. ‘Swing’ wells use the LP separator to unload liquids and thus improve their subsequent performance in the HP separator. Sonar metering determined the optimal cycle frequency for individual wells, allowing Marathon Oil to keep the LP separator full and maintain maximum rates in the HP separator. Wireless wellhead temperature sensors have been recently installed and have been correlated to sonar measured gas rates in the well bore, providing a real-time trend of liquid loading and well performance. Currently 75% of the well stock is cycled every 4 hours in order to optimize production. This intensive well management has assisted in reducing the production decline of the East Brae field.
