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Improving Well Safety and Maximizing Reserves Using an Innovative Surface Controlled Subsurface Safety Valve (SC-SSSV)

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Abstract

A common cause of failure with surface-controlled, subsurface safety valves (SC-SSSV) is a defect in the down-hole hydraulic line, which controls the valve from the surface. Such a failure generates production losses and requires the intervention of a costly workover rig – usually not immediately available. In order to alleviate this type of situation, a system has been developed where the physical control line has been replaced by a communication system based on electromagnetic waves. The surface emitter continuously sends a signal to the SC-SSSV. Both items are designed to be fail-safe. The normally-closed valve remains open while receiving the signal and closes as soon as the signal is lost. This innovative, control-line free, wireline-retrievable SC-SSSV can be set in any landing nipple profile or anywhere in the tubing using monobore lock technology without a workover or well head modification.

The primary application is to secure wells with a damaged or blocked control line, damaged landing nipple, or wells completed without an SC-SSSV. It provides an immediate cost-effective solution – allowing production to resume with a surface-controllable safety barrier while avoiding or postponing a costly workover. With the arrival of this technology, sub-standard and temporary solutions, such as the normally-open velocity and ambient valves, no longer need to be considered. Another application is to free up a hydraulic SC-SSSV landing nipple in order to install a device like a capillary string for chemical or gas injection at the bottom of the well safely.

A prototype has been built and successfully tested for six months in a flowing gas well with 15% H₂S – the case history is presented. The tool has proven to be easy to install and reliable. Deployment will start in 2008. Thousands of wells are concerned around the world.

This breakthrough slickline product offers new possibilities for safely and efficiently managing the countless failures of hydraulic SC-SCSSVs. Its versatility brings a reduction in production losses and provides the user with a cost-effective and reliable solution.

Introduction

LACQ field has been developed from 1951 to 1957 while solving metallurgical constraint due to the 15% H₂S and 10% CO₂ in its gas composition. At few kilometers, MEILLON, SAINT FAUST and PONT D'AS fields which produce the same long and narrow reservoir have started production late 1967.