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Title: **“Using Modular ‘Plug-and-Play’ Failure Mode Analysis (FMECA) to Minimize the Risk of Failure of Complex Intelligent Completions”**

ABSTRACT

Failure Modes, Effects and Criticality Analysis (FMECA) has become established as an important element of the qualification process for downhole equipment. Over the past few years, it has proved to be of real value, giving indications of potential failure modes early enough that they can be avoided. FMECA has become a mandatory part of BP’s process for qualification of newly developed equipment.

Prior to this work, FMECA focused on individual components in isolation. This paper describes an expansion of scope to encompass a system level analysis on a generic basis and a system level analysis of a specific system of equipment, both linked to the “normal” component level FMECA.

This paper illustrates the method with an example case study of a complex completion design incorporating sand control, interzonal isolation, intermediate formation isolation, downhole flow control (DHFC) and downhole instrumentation. The program was able to deliver key recommendations with a rapid turnaround time, to enable mitigation of high-priority risks by both the suppliers and the operator, avoiding potential failures in all phases of the operations.

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