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The Challenges of Designing HP/HT Equipment

Abstract

The Paper presents an overview of the main design activities for the Completion and Intervention Landing String System that was deployed in the Tahiti field in the Gulf of Mexico. The functional and structural design challenges encountered due to the high operating pressures and temperatures are reviewed. The Paper also illustrates how analysis tools were used to quantify the observations found during test, and subsequently assist in determining a design solution. A key aspect of the design process was to view the design and operations from a holistic perspective by evaluating the design throughout its operational life. This paper will therefore present how this design process established a design solution that increased the reliability and confidence of the Landing String System and therefore reduced the operational risk.

Introduction

This paper addresses the technical challenges of developing a high pressure/high temperature (HP/HT) Completion and Intervention Landing Sting System for the Tahiti field in the Gulf of Mexico. As the project presented some specific operational challenges, traditional analytical methods were insufficient for the design process and a comprehensive test and qualification program was required to validate that the equipment proposed was fit for purpose. The paper presents an overview of the design methodology adopted and how the results from finite element modeling assisted in validating the test program.

This paper also discusses the management of operational risk for HP/HT equipment and how the lessons learned during the design process will be addressed in future. The key areas of discussion are therefore as follows:

- The purpose and functionality of a Landing String
- A review of the design methodology adopted for the Tahiti project
- An illustration of HP/HT analysis work performed
- The management of operational risk
- A summary of operational performance
- Lessons learned
- Future work