

## Independent Review of IWOCS FMECA and Design Assurance

Independent Review of Failure Mode Effects and Criticality Analysis (FMECA) of the Intervention Workover Control System (IWOCS) for a large offshore deepwater asset in the Gulf of Mexico.

**Client:** Undisclosed

**Date:** 2017 – 2018

**Location:** Gulf of Mexico, USA

**Neptune** Subsea Engineering (NSE) was contracted by a major operator to carry out an independent review of the Failure Mode Effects and Criticality Analysis (FMECA) of their Intervention Workover Control System (IWOCS). This FMECA review was intended to form part of acceptance criteria, prior to the use of the IWOCS in the Gulf of Mexico (GOM).

Our scope of supply included:

- ✚ Reviewing the FMECA worksheets provided as part of the OEM FMECA Reports. As the outcomes of the review, NSE detailed comments on every line item of the OEM FMECA along with general comments related to the overall approach.
- ✚ Reviewing for gaps in the FMECA, to identify additional potential failure modes for future review and analysis. As the outcome of this, NSE recommended additional areas for assessment.
- ✚ Reviewing the Technology Readiness Level (TRL) for the IWOCS components, based on the OEM TRL document. As outcomes, NSE made general and component-based comments on the qualification claims and qualification gaps.
- ✚ Reviewing the design criteria and specifications, by high-level benchmarking of OEM IWOCS specifications against those required by the operator and pertinent industry standards. The outcome of this task included recommendations for further review.
- ✚ High level review of the Investigation and Feedback Sheet for a specific issue identified in testing. The outcome of this task included identification of qualification gaps and recommendations for further review.
- ✚ Reviewing and responding to OEM Responses to the NSE report.

NSE review findings and recommendations included:

- ✚ Confirmation of compliance with all Operator functional specifications
- ✚ Extension of the FMECA to assess specific components not yet addressed
- ✚ More detailed review against best practices
- ✚ Evaluation of FMECA risks in the context of the Operator risk assessment process
- ✚ Completion of any gaps in the FMECA failure mode identification.
- ✚ Additional review of operational philosophy and procedures with focus on the consequences of failure of key identified valves
- ✚ Provision of more detailed evidence relating to TRL assessment and TRL claims
- ✚ More detailed assessment of any potential single points of failure

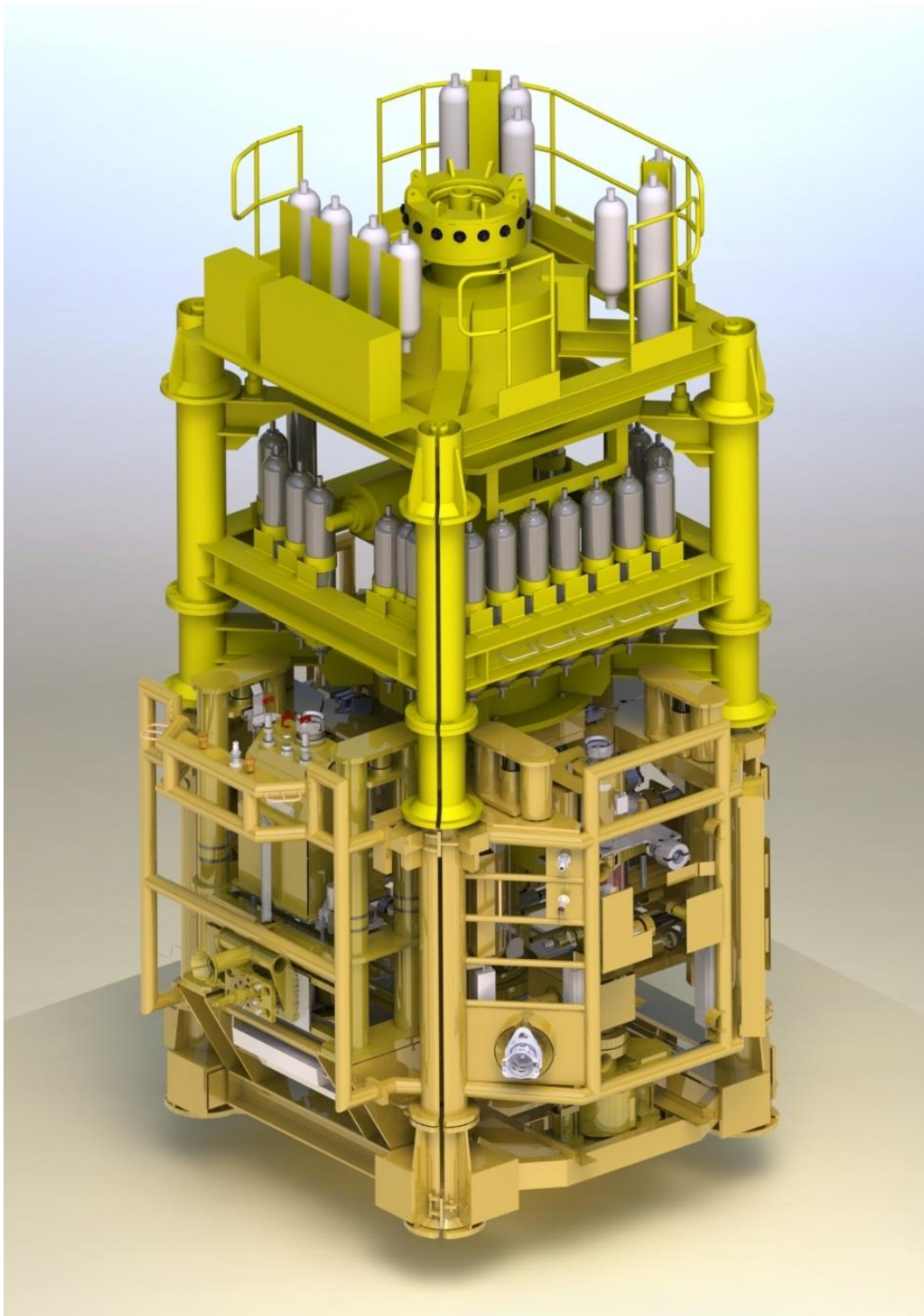


Figure 1: Example EDP and LRP installed on XT.