

Light-Weight Intervention Support Equipment

Engineering, analysis and manufacture of key components for a Well-Stimulation System

Client: BP Exploration & Production

Time: 2013 – 2015

Location: UK North Sea

Neptune was contracted for the engineering, manufacture and testing of a twin manifold system for a riser-less well stimulation campaign. Structural analysis and flow assurance of the system (including CFD analysis and optimisation, thermal expansion and erosion calculations) were carried out to ensure the delivery of desired inhibitor flow rate at the required well injection conditions.

Our scope of supply included:

- ✚ Flow assurance analysis, including Computational Fluid Dynamics (CFD) analysis to quantify pressure loss and erosion risk
- ✚ Finite Element Analysis (FEA), including thermal analysis, to ensure structural integrity
- ✚ Interfacing with client, OEM's, assurance bodies and vessel personnel
- ✚ Manufacture, assembly and testing of key elements of the well-stimulation system
- ✚ Design and manufacture of a shipping and handling basket to maximise offshore operation efficiency
- ✚ 3D modelling of operational steps to predict potential interfacing problems of equipment and optimise operational procedure

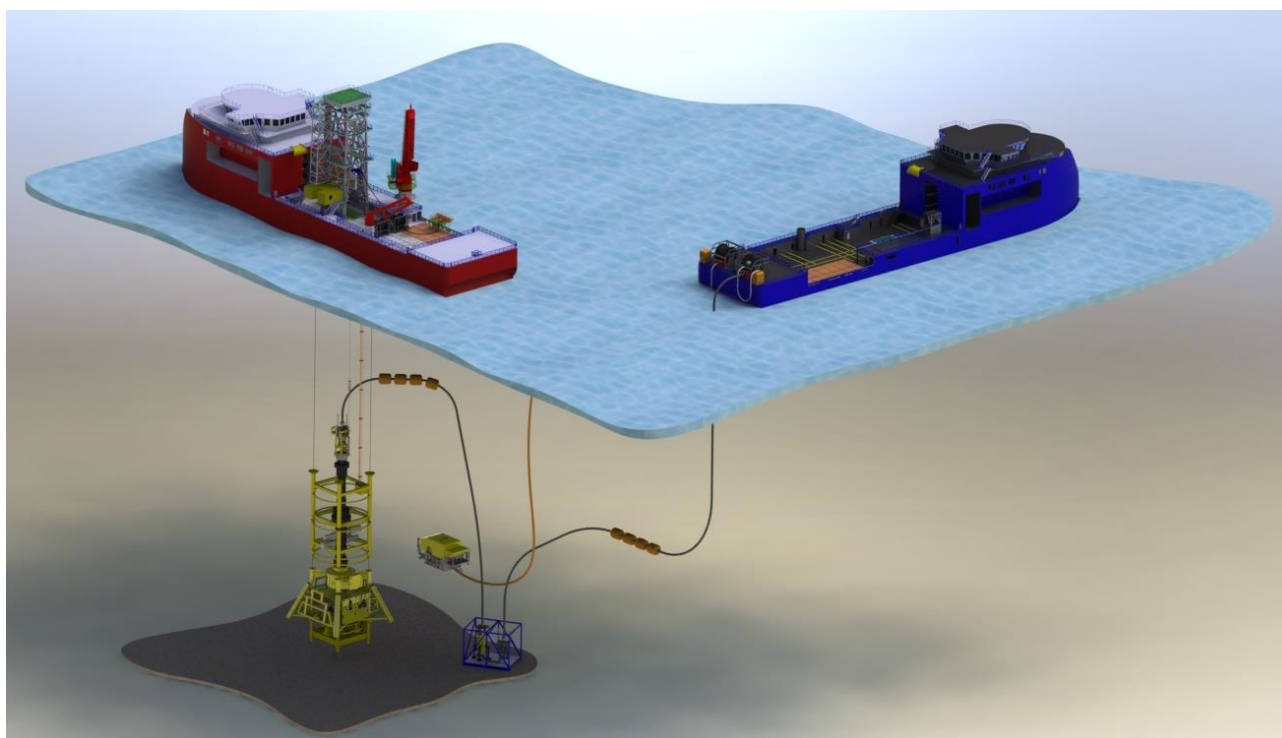


Figure 1: Model of well-stimulation operation to predict potential interface issues.

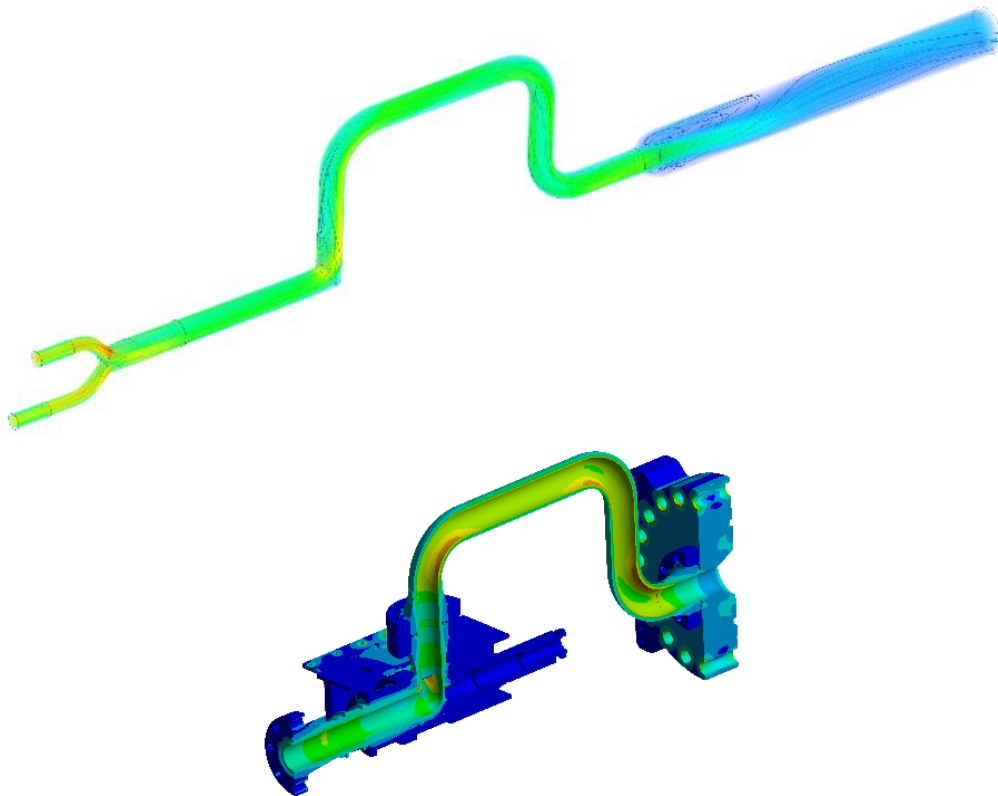


Figure 2: Upper – CFD model of Well-Stimulation System to identify regions causing high pressure loss and high erosion risk.
Lower – FEA model to verify the structural integrity under the effects of the flow pressure and temperature.

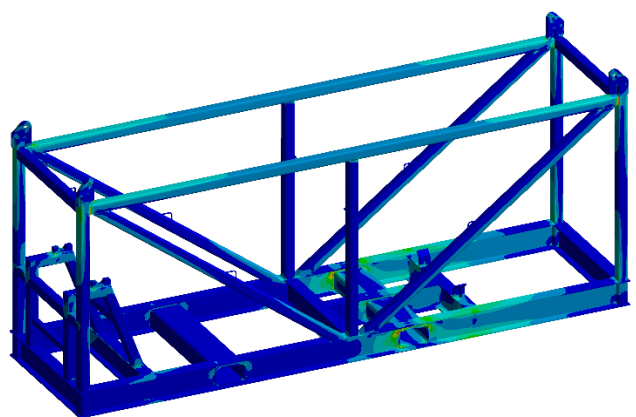


Figure 3: Left – In-house system integration test of complete Well-Stimulation System.
Right – FEA model of shipping and handling basket also engineered and manufactured by Neptune.