

The Problem

A temporary offshore diverter line is used when a shallow gas pocket is breached during drilling, venting a mixture of sand and grit along with the gas. As a result they are subject to high levels of erosion during their short operational lives. Although not a permanent fixture, the operator of this line wanted to be certain it would be able to last the full extent of drilling operations without unacceptable wall thinning.

MMI were asked to calculate the operational life of the line under two different flow conditions. We took a conservative approach designed to ensure the line was certain to be adequate.

Our Approach

We used 3D Computational Fluid Dynamics to model the gas flow, and then used Lagrangian particle tracking to record impact locations, angles, and speeds. With this data we used Finnie's model for erosion rates to predict the resulting damage. Flow, solid content, and material properties were all set to pessimistic conditions.

Outcome

We demonstrated that the line was more than sufficient for the worst possible conditions and would last for the duration of operations. This allowed the operator to complete the safety case for the drilling activities.

