

## Case History

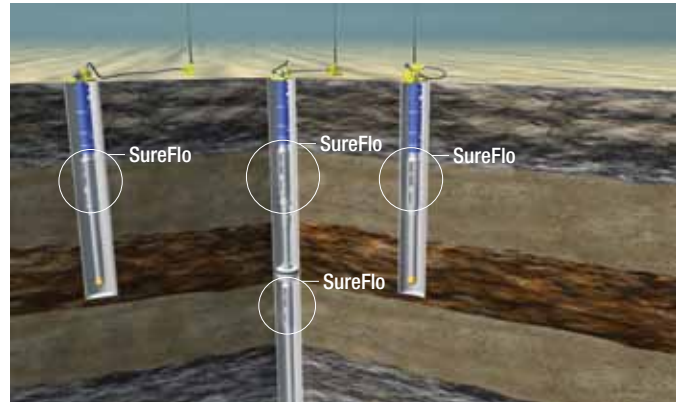
# Deepwater Subsea Tieback Development

## Situation

Many Gulf of Mexico (GoM) operators have a deepwater development strategy to tieback multiple wells for subsea fields. Wells from the same reservoir are commingled at a subsea manifold, and the production is flowed back on a single pipeline to the platform. In doing so, it is important to understand the contribution of the flow from each individual well from a production allocation as well as pipeline integrity standpoint. Pipelines have an erosional threshold, and it is crucial that the total production rate through these pipelines does not exceed the limit.

## Objective

Baker Hughes was approached by BHP Billiton to provide a method of downhole flow, pressure and temperature monitoring on the Boris, Little Burn and Neptune projects with the aim of providing flow allocation for subsea commingled wells. Apart from flow allocation for production purposes, the measurements were also being used to ensure that pipeline integrity was not breached due to erosion.



Subsea tieback development using SureFlo technology for production allocation.

## Solution

The best technology to address production allocation and infrastructure integrity monitoring is SureFlo™ 298. This downhole flowmeter can be customized so that the measurement accuracy is greater than  $\pm 98\%$ , making it a feasible tool for production allocation for fiscal purposes.

## Results and Benefits

In the Boris development, the Boris #1 well travels through a 5-inch multiphase flowline approximately 7,000 ft in length where it is joined by the production from the Boris #2 well at a subsea manifold. There is a 20,000 stb/d erosion limitation on the flowline. Having the ability to monitor the contribution of production from both wells, the production rate through the flowline was kept below this threshold. The cost of changing over to a new flowline is at least US\$65M.

During the development of Boris, the Mineral Management System (MMS) in the GoM also accepted the Baker Hughes SureFlo 298 system as a viable method for well production allocation. Therefore, the amount of well testing that had to be performed was minimized, thus maximizing production from the field. More importantly, any flow assurance issues were mitigated when wells had to be shut in while on test. This technology has now been adopted for the Little Burn and the Neptune asset teams. In the Neptune project, the field has seen the fastest ramp up (five wells in five days) due to the ability to allocate production in real time from each well.



The Neptune oil and gas field lies in the Western Atwater Foldbelt, where BHP Billiton has made hydrocarbon discoveries at Mad Dog, Atlantis, Shenzi and Puma.

■ Lease ■ Oil Field ■ Gas Field ■ Oil Pipeline ■ Gas Pipeline