

# Aker BP Norway Used Advanced Technology to Control Sand Cleanup

Powerful flowmeters integrated real-time multiphase metering and solids measurement capabilities

**New measurements using Vx\* multiphase well testing technology were key to optimizing the CT intervention and reducing the risk of the CT becoming stuck in the hole.**

## Increasing production safely and efficiently

In 2019, Aker BP ASA, Schlumberger and Stimwell Services established a Well Intervention and Stimulation Alliance to accelerate and boost oil production. When it was noticed that oil production declined due to sand accumulation, the alliance partners worked together to help recover well productivity. This would require a coiled tubing (CT) intervention to clean up sand in the wellbore and increase the production safely and efficiently.

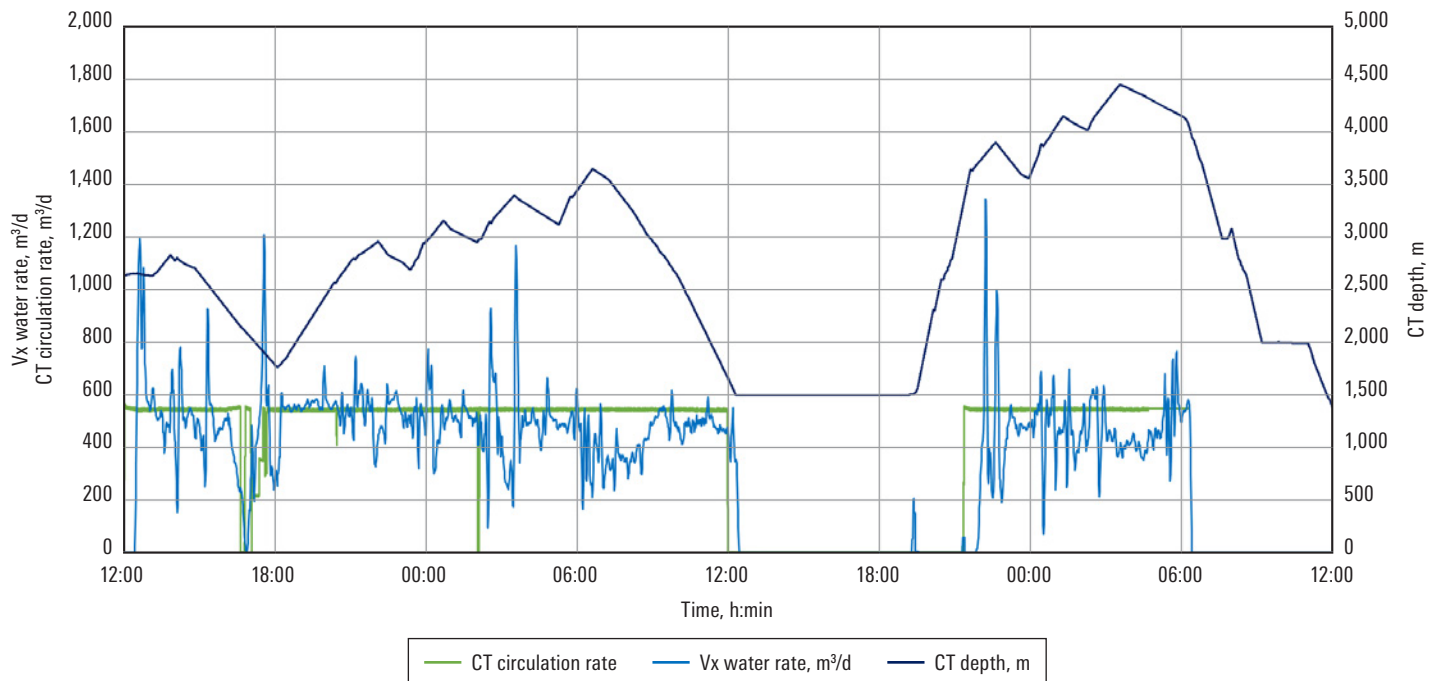
Offshore CT intervention is a complex operation that requires careful planning and close attention. During CT execution, it is important to monitor the injection and production flow rates at the surface to make sure that the flow from the well is balanced. Extensive sand production during CT intervention can introduce a significant risk for the CT to become stuck in the borehole.

## Ensuring a balanced flow in the well

To increase the efficiency of the CT intervention, Schlumberger recommended using a flowmeter equipped with Vx technology. In addition to the standard flowback equipment, the Vx technology helps integrate real-time multiphase metering and solids measurement capabilities. The technology uses a combination of low-energy gamma radiation fraction measurements, along with a fluid dynamics model to determine flow rates of individual fluid phases without separation. As a result, the flowmeter measurements helped to

- assess the effect of the treatment
- detect hydrocarbons at the surface, in case the well started to flow
- measure liquid and gas return at the surface for material balance, comparing injection rate with liquid return at the surface
- measure the solids production rate at the surface.

Such measurements helped ensure that the CT intervention was balanced with minimal fluid losses into the formation.



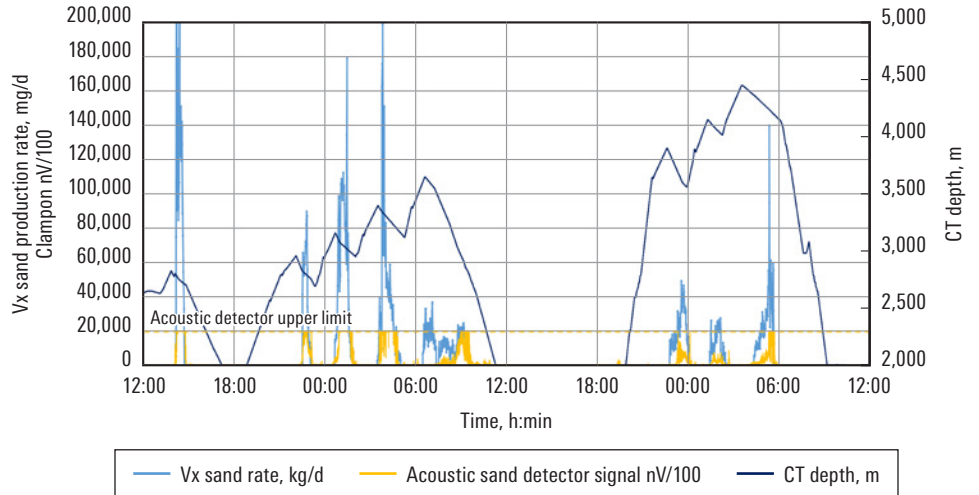
*This material balance plot shows the difference between the volume of water pumped through the CT and the surface liquid return flow rate. This indicates whether there are fluid losses in the formation or reservoir fluid influx in the wellbore. In this case, the flow was balanced most of the time, with occasional minor fluid losses to the formation. Without accurate measurements provided by the Vx technology, the intervention would be performed blindly with a high risk of CT becoming stuck in the borehole or hydrocarbons being produced to the surface.*

## Case study: Aker BP Norway used advanced technology to control sand cleanup, North Sea

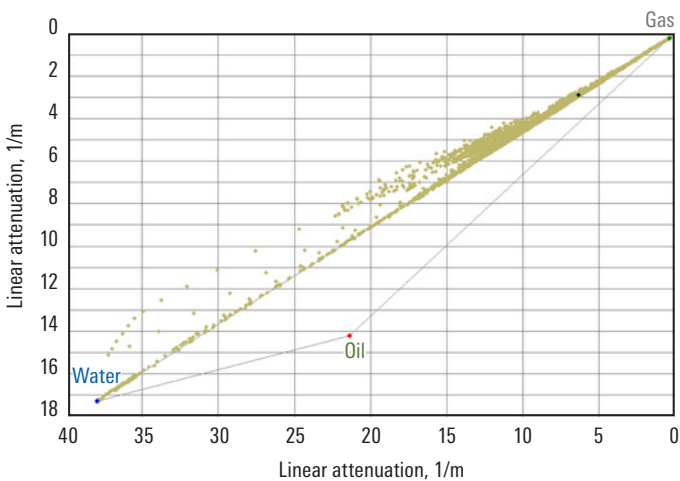
### Optimizing the intervention

Thanks to high-frequency measurements, the produced solids were detected instantly and measured at the surface by the flowmeter operating in solids mode. The performed solids rate measurements were in total agreement with the sand intensity measured by the acoustic sand detector. Due to the volume of solids produced to the surface, acoustic detector measurements were off the scale at times.

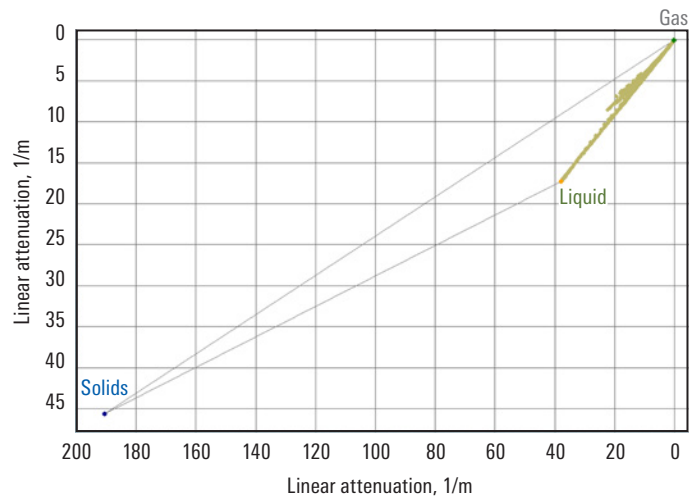
The flow rate and solids production rate measurements provided by the Vx technology were key to optimizing the CT intervention work and reducing the risk of the CT becoming stuck in the hole.



This combined readout by the Vx flowmeter and acoustic sand detector shows sand production at the surface during CT well intervention. Readings such as this helped assess the risk of CT becoming stuck in the hole.



This graph shows the operating triangle of the multiphase flowmeter, with each angle representing one of the flowing phases (gas, liquids, and solids). The green points represent operating data points. In this case, the plot shows that there was mainly water flowing through the multiphase flowmeter. Points on the left side of the triangle indicate solids present in the flow.



This graph shows the operating triangle for the multiphase flowmeter operating in solids mode; it helps assess the volume of sand in the flow and calculate the solid flow rate. This is a new feature of the Vx technology, used on this job for the first time, which proved extremely valuable to measure solids flow rate in real time during CT well intervention operations.

[slb.com/VxSpectra](https://slb.com/VxSpectra)

**Schlumberger**