Offshore Services
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Erik Wiik
Regional President | Aker Solutions - North America
Number of deepwater wells are growing

# of subsea wells installed per year

- 2012: 200 wells
- 2014: 400 wells, +14% increase
- 2016: 600 wells
- 2018: 800 wells

Total # of subsea wells installed (installed base in production)

- 2012: 4000 wells
- 2014: 4500 wells, +10% increase
- 2016: 5000 wells
- 2018: 5500 wells

Sources: Raymond James research, Quest Offshore, Spears & Associates, Baker Hughes.
Advanced services driving up hydrocarbon recovery rate

These systems facilitate:

**Improved oil recovery** e.g. well intervention and **Enhanced oil recovery** e.g. chemical injection, thermal heating.
Workover Systems – providing safe access to subsea wells

A Workover System is designed to:

- Install Subsea trees
- Test Subsea trees
- Perform Well testing
- Provide downhole access for tool strings

A high pressure & high temperature conduit from rig/vessel and down to the subsea tree are built up by:

- multiWOCS™ - The Workover Control System (located on the rig)
- riserLOCK™ - The Workover riser
- Lower Workover Riser Package – The light workover BOP (including cutting ram’s)
Lower Workover Riser Package – the well intervention BOP Design driven by the need for safe well control

- In accordance to standard ISO/API valve layout
- Retainer Valve in Emergency Disconnect Package
- High Angle EDP connector
- Production Isolation Valve (PIV) in Lower Workover Riser Package (second barrier)
- Safety Head (SH) in Lower Workover Riser Package (main barrier)

Safety head
- Extreme cutting capacity for increased safety
- Metal to metal seal for more reliable sealing

Cutting Gate valve (PIV and RV)
- Qualified to cut Coiled tubing and Wire line
- Spring actuated FSC
- Enables compact EDP and LRP design
Advanced oilfield service vessels

- Subsea Intervention
  - Installation, testing and maintenance of subsea & top section downhole equipment
  - Deepwater capabilities

- Riserless Well Intervention
  - Subsea wireline operations, such as logging, perforation, zone isolation plug setting / removal etc.

- Riser Well Intervention
  - Coiled tubing and wireline intervention
  - Well test and clean-up
  - Chemical injection, circulation, sand removal, push force and scale milling

- Light drilling
  - Through tubing drilling with coil and downhole motor
  - Through tubing rotary drilling with slim pipe and system for managed pressure drilling

- Extended services
  - Top hole drilling
  - Plug & abandonment
Advanced deepwater assets in operation

Installation and retrieval of subsea trees and modules using fiber rope deployment system.

Providing well access through High Pressure Riser and Intervention System allowing Coil Tubing, Wireline and Pumping Services.

Sister ship to Skandi Aker.

Without well intervention topside installed.

Currently performing subsea construction work.
Vessel and system description

- Largest monohull well intervention vessels
  Sized to house deepwater riser intervention system, wireline and coiled tubing spread plus a well test package.

- Safe intervention on DP
  Tension systems catering for large drive and drift off’s without risk of compensator lock up or pressure control rig up hitting drill floor.

- Innovative Upper riser system
  Use of submerged flow and safety head with low pressure telescopic joint facilitating building of wireline / coiled tubing tool strings in non heaving environment.

- Integral fluid & pumping systems
  - 400 m$^3$ mixing system
  - 45 m$^3$ bulk storage
  - 400 m$^3$ fluid storage + 1000 m$^3$ drillwater
  - 3 HP pumps + 1 chemical injection pump

- State of the art 450 tonnes module handling system
  Automated handling systems minimizing manual handling.

- Dimensions: 156.9 m x 27.0 m
- Deadweight: 8,500 T
- P.O.B: 140
- 2 Cranes (rated to 2,700 m water depth):
  - 400t AHC Main Crane (225 t @ 2,500 m)
  - 50t AHC Crane (25 t @ 2000 m)
- 2-off heavy duty work class ROV’s
- Well test area, burner booms and deluge system
- Moon pool: 7.2m x 7.2m
- Class: DNV Well Intervention Unit DP-3
Leading operators are currently:
- developing rigorous open water specifications,
- procuring a range of workover systems adapted to their installed base,
- considering permanent charter of light intervention vessels as well as
- developing the next generation of advanced IOR tools.

Driving cost per barrel down by increasing the recovery rate.
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