Introducing the Aptara™ TOTEX-lite subsea system

Scott Hamilton
Engineering Director, Subsea Production Systems & Services, BHGE

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BHGE Fullstream capability

- Reservoir optimization
- Lean well construction
- Aptara™ TOTEX-lite subsea system
- Topside optimization
Subsea CAPEX investments projected to rise

Notes:
Subsea Equipment—subsea trees and wellheads, templates, and manifolds.
SURF—procurement of risers, umbilicals, and flowlines and the installation of these in addition to the installation of subsea trees, manifolds, and control modules.
Subsea Services—sub-segments IMR, ROV Drill Support, subsea testing, and subsea tool pool rental.
What if a subsea production system could reduce total cost of ownership by 50% over the life of field?

Today, there is one.
Delivering the next generation of subsea system technology

✓ Lightweight and compact
✓ Modular—easier to configure
✓ Reliable execution and on-time delivery
✓ Optimized lead time
✓ Cost-effective solutions
✓ Dependable systems; maximizes uptime
Beyond the basics

We go beyond **CAPEX**

We look beyond **installation**

We look beyond **cost**

we look at **total cost of ownership**

we design for **the life of your field**

we focus on **real and measurable value**
Aptara™

Aptare [verb]: to adapt, fit, apply

- **TOTEX-lite approach**
  - Drives real and measurable value; 50% lower TCO

- **Life-of-field design**
  - Unlocks value through increased flexibility

- **Modular, structured, lightweight & compact**
  - Enables reliable execution and on-time delivery
Aptara™ TOTEX-lite subsea system, designed for the life of field

Aptara™ lightweight compact tree with tree caps
Aptara™ modular compact manifold
Aptara™ modular compact pump (module)
Aptara™ composite flexible pipe
FLX360
HCCS-Lite
Aptara™ subsea connection systems
Aptara™ SFX wellhead solution

enabled by our industry-leading Aptara™ lightweight compact control system
Introducing TOTEX-lite engineering and development

From products to a systems view
Focused on TOTEX
- CAPEX + OPEX
- over the life of field
- the total cost of ownership—a more effective measure of value
Aptara™ TOTEX-lite subsea system delivers real and measurable value

Life-of-field design unlocks value through increased flexibility

• Products have been designed to maximize value over the life of field—up to 50% reduction in TCO
• Industry-first patented designs drive real and measurable value eliminating the need for complex field development infrastructure
• Gives operators flexibility—no need to decide about late-life infrastructure at commissioning
Aptara™ TOTEX-lite subsea system delivers real and measurable value

- Up to 30% lower lead times and lower overall costs
- Reliable execution and on-time delivery
- Modular designs allows products to be configured depending on the requirements of individual operators and fields
- Up to 50% lighter and a dramatically smaller footprint—slashes logistics and installation costs; smaller vessels can be used providing more flexibility, while also lowering carbon footprint
Aptara™ lightweight compact tree

ATQ 4Q 2018

- Can reduce total cost of ownership (TCO) of your subsea production system by up to 50% over the life of field

- Innovative new flowpath reduces number of valves for same functionality whilst complying with API 17D 2nd edition

- Patented tree caps eliminate need for HIPPS and subsea boosting; can be leased and reused

- Modular, 50% lighter and with a considerably smaller footprint
Aptara™ modular compact manifold

ATQ 4Q 2018

• **Modular and compact design:** “off-the-shelf” components, lower cycle time, cost, & footprint

• **Common Parts** - re uses Aptara™ lightweight compact tree valves to offer higher integrity sealing solution.

• **Flexible** to cater for variation in header size without impacting header blocks

• **Easy installation:** manifold and mudmat installed with a single lift using smaller, lower-cost vessels

**Lead time:** 10 months
Aptara™ composite flexible risers

ATQ 4Q 2018

• **30% lighter** than conventional flexibles

• **TOTEX-lite**: free-hanging catenary configuration in up to 3,000 m water depth
  • no need for buoyancy elements
  • reduces the length of risers
  • simpler and more economic installation

• **CO₂ and high sour gas** applications

• eliminates riser system complexity, and **reduced cost and installation time** while delivering **predictable & stable** hydrodynamic performance over **full product life cycle**
Aptara™
SFX wellhead solution

ATQ 1Q 2018

- Life-of-field approach to design delivers **16x fatigue resistance improvement** over existing systems
- Enables **safe and low-risk** production enhancement through **well intervention even in late life**
- Extended drilling days in harsh environments
- **Lead time: 6 months**, i.e. 8 months faster than conventional wellheads
Aptara™ modular compact pump

ATQ 2Q 2019

• Extremely compact: 50% lower topside footprint; more power in a smaller package

• No barrier fluid translates to simpler and lighter umbilical

• Modular: standard pre-qualified 1 MW building blocks enable configuration to different field requirements

• Higher reliability: all electric design, variable speed drives enable dynamic reaction to changes in flow

Note: This is a pump module
Aptara™ is built on a structured and modular product portfolio
BHGE Subsea Production Systems – Product Structuring
Our structured portfolio has real and measurable benefits

**Make to order**
- Fully engineered and configured to meet typical field requirements

**Configure to order**
- Standard components and sub-assemblies configured into suitable subsea systems
- Minimal additional engineering hours

**Engineer to order**
- Addresses customer needs outside our regular boundaries and options

- Industry-leading technology
- Optimized and predictable lead times
- Faster response and cost-efficient solutions
- Fit-for-purpose solutions for common applications
Introducing the subsea industry’s first comprehensive SPS Catalog

www.bhge.com/SPScatalog
APTARA LIGHTWEIGHT COMPACT TREE

Our revolutionary Aptara® vertical tree is lightweight and compact and uses our life-of-field approach to reduce not just initial CAPEX but also OPEX over the entire life of your field. This TOLEX®-like approach uses a unique industry-first tree cap design that allows it to be adapted to the seabed to address the changing requirements of your field over its life.

These simple, lower-cost vertical subsea systems incorporate 6-inch, 8-inch and 7-inch production boxes, 10,000 psi pressure ratings and can be run with or without a tubing head spool. The Aptara® lightweight compact tree can be deployed in up to 10,420 ft (3,000 m) of water.

While our Aptara® lightweight compact tree is built on mature field-proven technology, its design is driven by our life-of-field approach. It uses an innovative flow path that reduces size and complexity, which supports faster field development, lower field total expenditure (TOLEX) and allows you to realize increased value from your reservoir. The configuration has also been simplified, with a lower valve count requirement that still provides all the functionality you need and complies with all industry standards.

The Aptara® lightweight compact tree has been designed with the entire lifecycle in mind and our Make to Order variant can be delivered in 10 months. By reducing the number of components, the footprint and weight of the compact tree is reduced by around 16% compared to a traditional deepwater tree.

With this reduction in size and complexity, comes a reduction in costs across the entire manufacturing cycle of the tree. Its size and weight offer you flexibility during installation and enable vessel optimization. If you want to flow the well, you can also use a Subsea Test Tree (STT) system, either before or after tree installation, as well as a traditional Open Water Completion Workover Riser (OWCR).

The Aptara® lightweight compact tree includes integrated flow metering, comprising DHI’s Virtual Flow Meter (VFM), downhole flow meter (Domino) and water cut measurements at the tree, providing accurate oil, gas and water flow rate measurements all the way up. It also supports enhanced real-time condition monitoring and diagnostics enabling active control and monitoring of subsea equipment integrity.

Typical lead time: 10 months

Our Make to Order Aptara™ lightweight compact tree variant can be delivered in 10 months.
Aptara™ TOTEX-lite subsea system, designed for the life of field
Aptara™ TOTEX-lite subsea system, designed for the life of field

enabled by our industry-leading Aptara™ lightweight compact control system